School City of Hobart
Shoreline Stabilization Design Report

LAKE COUNTY, INDIANA

August 31, 2005

Prepared by:

708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

Prepared for:

City of Hobart
414 Main Street
Hobart, Indiana 46342

TABLE OF CONTENTS

1.0 Project Description and Purpose....1
2.0 Design Rationale....2
3.0 Design and Construction Specifics....3
3.1 Permitting....3
3.2 Landowner Agreements....3
3.3 Treatment A....3
3.4 Treatment B....3

4.0 Opinion of Probable Cost....4
5.0 Bidding Requirements....5
6.0 Specifications....5
7.0 Construction Schedule....5
8.0 Monitoring and Maintenance Schedule....5
9.0 Project Summary....6

APPENDICES

Appendix A. Permits
Appendix B. Design Plans
Appendix C. Specifications
Appendix D. Maintenance and Monitoring Form

SCHOOL CITY OF HOBART AND FLEMING STREET
SHORELINE STABILIZATION DESIGN REPORT
LAKE COUNTY, INDIANA

1.0 PROJECT DESCRIPTION AND PURPOSE

The School City and Fleming Street properties are located east of Fred Rose Park along the shore of Lake George in Hobart, Indiana (Figure 1). Specifically, the School City property and Fleming Street are on the southern shoreline of Lake George at the intersection of 7th street with Fleming Street (Figure 2). The shoreline along School City and Fleming Street properties exhibit moderate to severe erosion.

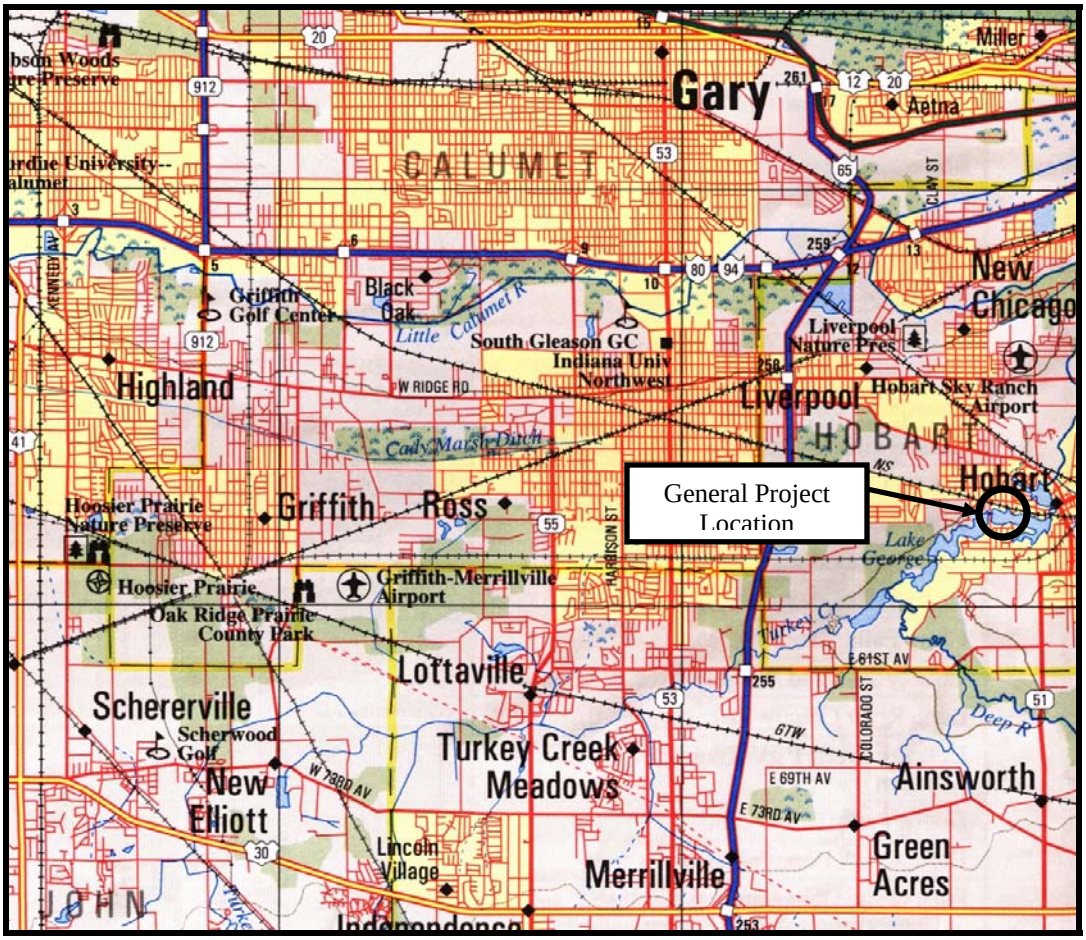


Figure 1. Fred Rose & Jerry School City and Fleming Streets general project location.

This erosion can be attributed to fluctuating water levels, wave action, and pedestrian traffic. Lake George's water level can fluctuate widely after significant precipitation events within its watershed. It is not uncommon for Lake George's water level to rise more than three feet following sustained heavy rain events. One of the most recent examples of this occurred between June 11 and June 14, 2004 when the USGS gage on Deep River at the Lake George

outlet recorded a nearly 4-foot increase in lake water level. Water level fluctuations and wave action cause the expansion, contraction, and collapse of the soil structure at the base of the shoreline slopes. Once these processes have undermined the slopes, the top of the banks collapse into the water, and the erosion process repeats itself on the newly exposed banks.

Figure 2. Location of School City and Fleming Street project area.

2.0 DESIGN RATIONALE

The design chosen for this project reflects the desire to stabilize the shoreline with low maintenance vegetation while minimizing disturbance to the existing oak savannah habitat. Two different treatment methodologies (Treatment A and B) were chosen based on the various stages of erosion present along the shoreline. Treatment A consists the installation of pre-planted coconut fiber logs (coir logs) along existing shoreline areas that have moderate slopes leading to the water's edge and possess slight to moderate shoreline erosion. Treatment B involves reconstructing the shoreline slopes by building modified soil encapsulated lifts on top of a rock base that extends 4 to 12 feet out into Lake George. Each of these treatment types eliminates the need to pull back the existing slopes, thereby preventing the removal of mature trees and minimizing disturbance of the existing oak savannah habitat bordering the lake.

3.0 DESIGN AND CONSTRUCTION SPECIFICS

3.1 Permitting

A Lake Preservation Permit is required from the Indiana Department of Natural Resources (IDNR) to complete the proposed work because fill will be placed "lakeward of the lake's legal or average shoreline". Clean Water Act Section 401 Water Quality Certification from the Indiana Department of Environmental Management (IDEM) and a Section 404 permit from the U.S. Army Corps of Engineers (USACOE) are required because Lake George is considered a "water of the United States". The IDNR, IDEM, and USACOE permits authorizing the construction of the shoreline stabilization measures along School City and Fleming Street shorelines are included in Appendix A. The attached permits also include Fred Rose Park shorelines adjacent to the eastern boundary of the school.

3.2 Landowner Agreements

The proposed bank stabilization work area is located entirely within the boundary of School City of Hobart and the City of Hobart (Fleming Street). The School City of Hobart is the sponsor of the project and will continue to own and maintain the shorelines on their property indefinitely. No agreement is necessary to conduct the project or to complete any follow-up maintenance.

3.3 Treatment A

Shoreline areas with moderate gradients leading to the water's edge and slight to moderate shoreline erosion (1-3 feet) will be stabilized with 16-inch diameter, coir logs. Installation of this treatment will occur along 400 lineal feet of shoreline at the end of Fleming Street. The coir logs will be pre-planted with native plant species plugs three months before installation. This will affect scheduling and timing of the construction. The coir logs will be placed in the water following the contour of the existing shoreline. The coir logs will be held in place with driven wooden stakes placed on 3-foot centers along each side of the log. Nylon rope will be woven between the stakes and over the logs to hold them in place. Voids between the coir log and shoreline will be filled with clean earthen fill to match the existing upland grade. The earthen fill will be planted with a native seed mix. Species to be included in the seed mix are listed in the design plans (Appendix B) and in the Specifications (Appendix C). After seeding, the filled slope will be blanketed with a turf reinforcement mat (TRM) and stapled in place following the manufacturer's recommendations. Once the vegetation matures, the native plantings will secure the soils, including the immediate shoreline, with their root mass. The coir log is expected to last from 5 to 7 years before decomposing and leaving a fully vegetated shoreline. The TRM has biodegradable coconut fibers encased within permanent synthetic mesh. The permanent mesh is expected to last 50 years or more and serve to protect the base of the planted vegetation from being eroded. Details are included in the Plans and Specifications (Appendix B and C).

3.4 Treatment B

The proposed areas for Treatment B include embankment heights that range from 3 to 11 feet along the shoreline of the School City property. Treatment B is proposed along 1,000 lineal feet of School City shoreline. The following describes the construction sequence for stabilizing these steep slopes. A rock foundation will extend approximately 4 to 12 feet lakeward of the shoreline to provide a stable base to reconstruct the existing slope. The distance of rock lakeward of the

shoreline is determined by the height of the existing cut slope. The higher the embankment, the further lakeward the base must be placed in order to create a 1.5:1 (horizontal: vertical) slope. The rock will be installed at the toe-of-slope to an elevation of 604 MSL or approximately 3-feet above the lake bottom elevation. A non-woven geotextile fabric (filter cloth) will be placed between the rock and the lake bottom as well as between the rock and embankment fill above to prevent soil from being washed out through the rock by wave action or water level changes. Clean earthen fill will be placed on top of the rock base and graded at a 1.5:1 horizontal to vertical slope. Geosynthetic soil reinforcement (geogrid) will be placed every two vertical feet within the reconstructed slope to prevent mass slope failure. Native shrubs will be placed at the junction of the earthen fill and the rock to add long-term root strength to this junction. Native herbaceous plant species will be seeded onto the filled slope prior to the application of TRM and erosion control blankets (ECB). The TRM will be used for long-term protection of the reconstructed slope surface within the zone of annual water fluctuation. The intent of the native plantings is to secure the reconstructed slope with vegetative root mass upon maturity. The filled or disturbed slope above the TRM will be blanketed with a straw-coconut ECB. Treatment B details, including plant species lists, are attached in the Plans and Specifications (Appendix B and C).

4.0 OPINION OF PROBABLE COST

JFNew's opinion of probable cost for shoreline stabilization along the School City and Fleming Street property is $161,150 including engineering oversight. Table 1 reflects the unit costs by treatment type. Table 2 details the cost breakdown for items within each treatment type.

Table 1. Probable cost for School City and Fleming Street shoreline stabilization

Item	Unit	Unit Cost	Number of Units	Total
Treatment A	Lineal feet	$72	400	$28,800
Treatment B	Lineal feet	$117.70	1000	$117,700
Subtotal				**$146,500**
Administration	Each	10%	1	$14,650
Total				**$161,150**

Table 2. Worksheet estimates for individual work items within Treatment Types for School City and Fleming Street. Estimates include mobilization, acquisition of materials, incidentals, and installation.

Item	Unit	Unit Cost	Number of Units	Total
Coir log	Lineal foot	$52.00	400	$20,800
Seeding	Acre	$2,500.00	0.5	$1,250
TRM	Sq. yard	$4.85	1000	$4,850
ECB	Sq. yard	$3.55	2000	$7,100
Stone	Ton	$35.00	1200	$42,000
Filter cloth	Sq. yard	$1.50	1000	$1,500

Shrubs	Each	$3.00	500	$1,500
Embankment fill	Cubic yard	$30.00	2500	$60,000
Geogrid	Sq. yard	$7.50	1000	$7,500
Total				**$146,500**

5.0 BIDDING REQUIREMENTS

An invitation to bidders for the School City and Fleming Street work will be issued by the School City after they acquire construction grants. The adjacent Fred Rose Park will be completed prior to the School City project being implemented. It is expected that the bid process will conform to City of Hobart bonding and bidding practices. The invitation will include the project design plans and specifications (Appendix B and C). Design specifics, access to the project site, any proposed design modification, or other potential construction issues should be discussed in a pre-bid meeting with the engineering consultant or design engineer. It is expected that the School City and Fleming Street project will proceed to construction in late 2006 or early 2007.

6.0 SPECIFICATIONS

The specifications for this project are included in Appendix C. There are eight Specifications including ones for General Information, Clearing and Grubbing, Rock Toe Protection, Embankment Construction, Seed Mixture, Shrubs, Erosion Control Blankets, and Coconut Fiber Logs.

7.0 CONSTRUCTION SCHEDULE

Construction of School City and Fleming Street bank stabilization is anticipated to begin in the fall of 2006 or spring of 2007. Final construction schedules will be dependent upon funding.

8.0 MONITORING AND MAINTENANCE SCHEDULE

Seasonal monitoring of the site is recommended. The School City of Hobart's Maintenance Department should monitor the project site as part of their regular duties. The individuals conducting the monitoring should note any areas of shoreline stabilization or native planting failure within the construction limits. Shoreline stabilization failures include torn or displaced erosion control blankets or turf reinforcement mats, coconut fiber log displacement, gully formation under the erosion control blankets or turf reinforcement mat, and bank sloughing. Native planting failure includes: bare areas of more than 3 square feet after the first 4 weeks of the growing season following installation, less than 75% survival of shrubs, or less than 50% of the native species seeded during project installation after two full growing seasons. Failures

should be reported to JFNew so that remedial actions can be taken. Example monitoring forms can be found in Appendix D.

Invasive species such as honeysuckle, sweet clover, Canada thistle, purple loosestrife, and others are likely to be present on the site. Any herbicide application deemed necessary should be applied directly to the target plant species via a backpack sprayer or similar device. Maintenance crews should not mow or indiscriminately apply herbicides to the treatment areas to control invasive species, as the native species will likely be damaged at the same time. Prescribed burns should not be conducted along slopes that have been blanketed with the ECB's or TRM's for at least four years. Failure to do so may compromise bank stability by destroying the erosion control blanket or turf reinforcement mat.

9.0 PROJECT SUMMARY

The project as designed will stabilize the eroding shorelines of the School City and Fleming Street properties with bioengineering technology, while protecting the developed or wooded areas at the top of the banks. The shorelines will be stabilized at the toe-of-slope in most areas with rock, and all cut banks will be filled and planted with native species. A total of 1,400 feet of shoreline along School City and Fleming Street properties are proposed for stabilization. Construction costs are estimated to be $146,500 and construction administration and inspection costs another $14,650 and could start as early as fall of 2006 provided grants are obtained for the work.

APPENDIX A

PERMITS

SCHOOL CITY AND FLEMING STREET
SHORELINE STABILIZATION DESIGN REPORT

LAKE COUNTY, INDIANA

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
REGULATORY OFFICE
SOUTH BEND FIELD OFFICE
2422 VIRIDIAN DRIVE SUITE # 101
SOUTH BEND, INDIANA 46628

August 15, 2005

IN REPLY REFER TO

File No. 05-145-020-0

Mike Farrell
City of Hobart Parks & Recreation Department
111 E. Old Ridge Road
Hobart, Indiana 46342

Dear Mr. Farrell:

Please refer to your application dated February 8, 2005 for a Department of the Army permit to discharge fill for bank stablization project in Lake George in Hobart, Indiana (Sections 31, 32, Township 36N, Range 7W, Lake County).

Under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, Louisville and Detroit Districts reissued Regional Permit 99-100-003-1 on December 15, 2004 for certain activities having minimal impact in Indiana. We have verified that your proposed work shown on the enclosed plans and described below is authorized under the Regional Permit. You may proceed with the work subject to the enclosed general conditions, any noted special conditions, and Indiana Department of Environmental Management (IDEM) Section 401 Water Quality Certification (copy attached).

The following work is authorized:

Shoreline protection are to be installed along 4,270 linear feet of the Fred Rose Park and an additional 1,375 linear feet of School City Property on Lake George to stablize the banks. A varity of shorline protection measures are to be implimented. The total filled area below the Ordinary High Water Mark (OHWM) is to be 0.86 acres. The project will involve the use of three methods which will include 1)coconut fiber rolls, 2)reconstructed slope treatment, and 3) repair to existing public access. Total of 2,818 cubic yards of rock, 40 cubic yards of clean earthern fill, and 104 cubic yards of fiber logs will be discharged below the OHWM of Lake George.

- The first type of shoreline proection will include 1,100 linear feet of 16-inch diameter preplanted coconut fiber logs

- The second shoreline protection is the discharge of fill material along 4,475 linear feet of reconstructed slope treatment. The amount of fill material and riprap discharge will vary

along the shoreline depending on the existing slope, but will not exceed 11' waterward of the OHWM and will average approximately 5' within the area where this shoreline line protection method is installed to establish a 1.5:1 (H:V) slope.

- The third method will invlove the 60 linear feet of repair to existing public access location.

Special Conditions:

1. Deposition of dredged/excavated materials and all earthwork operations shall be carried out in such a manner that soil erosion to any nearby water course are controlled and minimized, e.g. the use of straw bale barriers, silt fencing, or earthen berms around disturbed areas to prevent soil from leaving the construction site, the use of temporary dikes or bulkheads for separation and retention of settleable solids, and the placement of vegetative cover as soon as conditions allow on dredged/excavated material.

2. Install erosion control methods prior to any soil disturbance to prevent soil from leaving the construction site and/or entering any waterway.

3. Clearly mark the construction limits at the project site before construction and are to remain in place during all construction activities.

4. The permittee shall adhere to the conditions specified by the Section 401 Water Quality Certification issued by Indiana Department of Environmental Management (as attached).

5. If any archaeological or human remains are uncovered during construction, demolition or earthmoving activities, the permittee must stop work and immediately notify the District Engineer, and within two (2) days notify the Indiana Department of Natural Resources Division of Historic Preservation and Archaeology.

6. This permit does not authorize the discharges of dredged or fill material, including sidecasting, preliminary grading or incidental movement of soils, for access or haul roads, or to construct storing or staging areas or pads into any water of the United States including wetlands. No temporary or permanent discharges of dredged or fill material into wetlands or other waters of the United States other than that shown on the attached plans, shall not commence without prior written authorization from this office.

7. The disposal or chipping of trees, brush, and other debris in any stream corridor, wetland, or surface water is prohibited.

8 Physical disturbance of banks, submerged vegetation and riparian vegetation,

especially large trees which provide shade to the waterbody, should be limited to that which is absolutely necessary to the conduct of the project.

9 To the great extent possible all woody material should be left in the lake as habitat.

Any construction activity other than that shown on the plans may not qualify for the Regional Permit. If you plan changes or additional activities from those depicted on the plans, please submit them to this office for review prior to construction.

Upon completion of the work authorized by this RGP, the enclosed Completion Report form must be completed and returned to this office. This verification is valid until December 15, 2009, or 1 year from the date of this letter, whichever occurs later, unless the regional permit is modified, suspended or revoked.

If you have questions, please contact me at the above address or telephone (574) 232-1952. Please refer to File Number: 05-145-020-0.

Sincerely,

ORIGINAL SIGNED BY

John C. Ritchey
Project Manager
South Bend Field Office

Enclosures

Copies Furnished

IDEM, Office of Water
IDNR, Division of Water
J.F. New and Associates, Inc.

GENERAL CONDITIONS:

1. Minimization/Avoidance: Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site). In determining the minimal impact threshold, the Districts will consider the direct and secondary impacts of the fill or work and any mitigation measures. A wetland delineation report is also required.

2. Mitigation: The permittee shall provide a mitigation/monitoring plan for any activity where the adverse impact on special aquatic sites exceeds 0.10 acre (4,356 sq. ft.) or is determined to be more than minimal impact. The permittee shall also provide a mitigation/monitoring plan for any channelization, encapsulation, or relocation of greater than 300 linear feet of intermittent or perennial stream. All mitigation plans should include a minimum 50-foot wide buffer between the edge of the project site and the waters and/or wetlands to be affected unless a lesser distance has been specifically approved under the RGP. If mitigation is required, the permittee shall develop the mitigation site concurrently with site construction.

3. Soil Erosion and Sedimentation Controls: The permittee shall install sedimentation and soil erosion control measures prior to any construction activity, and maintain them in effective operating condition during construction. This shall include the installation of straw bale barriers, silt fencing and/or other approved methods to control sedimentation and erosion. The permittee shall immediately stabilize areas disturbed by any construction activity, including channel banks, and revegetated with a combination of grasses, legumes and shrubs compatible to the affected area.

4. Management of Water Flows: In-stream work during periods of high flows should be avoided. The activity must be designed to maintain preconstruction flow conditions to the maximum extent practicable. The activity must not permanently restrict or impede the passage of high flows (unless the primary purpose of the fill is to impound waters). The activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site.5. Waterfowl Breeding Areas: The discharge of dredged and/or fill material in known waterfowl breeding areas must be avoided to the maximum extent practicable.

6. Aquatic Life: The permittee shall not perform in-stream construction activity during the fish-spawning season between April 1 through June 30 without prior approval from the Districts. The Districts will coordinate with the Indiana Department of Natural Resources for their expertise on impacts to the fishery resource. The permittee will ensure that the activity authorized will not disrupt movement of those aquatic species indigenous to the waterbody, including those species which normally migrate through the area unless the activity's specific purpose is to impound water.

7. Equipment: All construction equipment shall be refueled and maintained on an upland site away from existing streams, drainageways and wetland areas. Heavy equipment working in wetlands must be placed on mats, or other measures taken to minimize soil disturbance.

8. Water Quality: The permittee must provide a copy of the site specific State Section 401 WQC before the Corps will authorize a project under the RGP.

9. Case-by-case conditions: The permittee must comply with any case specific special conditions added by the Corps or by the State Section 401 WQC. The conditions imposed in the State Section 401 WQC are also conditions of this RGP.

10. Navigation: The permittee shall assure that no activity authorized by the RGP may cause more than a minimal adverse effect on navigation.

11. Maintenance: Any structure or fill authorized by this RGP shall be properly maintained, including maintenance to ensure public safety.

12. Wild and Scenic Rivers: The permittee shall not perform any work within any Wild and Scenic Rivers or in any river officially designated as a "study river" for possible inclusion in the system, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity authorized by the RGP will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal Land Management agency in the area (e.g. U.S. Forest Service, Bureau of Land Management or the U.S. Fish and Wildlife Service).

13. Endangered Species: The permittee shall not perform any work under the RGP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. The permittee shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work under the RGP until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Authorization of an activity under the RGP does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act.

14. Historic Properties: The permittee shall not perform any activity under the RGP which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The permittee must notify the District Engineer if the activity authorized by the RGP may affect any historic properties listed, determined to be eligible or which the permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin construction until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology.

If the permittee discovers any previously unknown historic or archaeological remains while accomplishing the activity authorized by the RGP, work must be immediately stopped and this office immediately notified of what you have found. The District will initiate the Federal, tribal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

15. Water Supply Intakes: The permittee shall not perform any

work under the RGP where the discharge of dredged and/or fill material would occur in the proximity of a public water supply intake except where the activity is for the repair of the public water supply structure or adjacent bank stabilization.

16. Suitable Materials: No activity, including structures and work in waters of the United States or discharges of dredged or fill material may consist of unsuitable materials (e.g. trash, debris, car bodies, asphalt, etc.) and that materials used for construction or discharge must be free from toxic pollutants in toxic amounts.

17. Impoundments: The permittee shall ensure that if the activity approved by the RGP includes impoundment of water, measures will be taken to minimize adverse effects on the aquatic ecosystem caused by the accelerated passage of water and/or the restriction of flow.

18. Removal of Temporary Fills: The permittee shall ensure that all temporary fills, authorized under the RGP, be removed in their entirety and the affected areas returned to pre-construction elevation.

19. Access: Representatives from the Corps of Engineers and/or IDEM may inspect any authorized activity or mitigation site at any time deemed necessary to ensure compliance with the terms and conditions of the RGP, Section 401 WQC, and applicable laws.20. Construction Period: All work authorized by this RGP must be completed by the expiration date of this RGP or 1 year after the date of the Corps authorization letter, whichever occurs later. If you find you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 3 months before the expiration date.

21. Reporting: The permittee after completion of work under the RGP shall submit a signed certification letter regarding the completed work and required mitigation, if applicable. The certification letter will include a statement that the work was done in accordance with the RGP authorization including compliance with all general and special conditions and completion of mitigation work.

PERMIT COMPLETION REPORT

Detroit District, Corps of Engineers

CELRE-RG-A-S 05-145-020-0

Commander
U.S. Army Engineer District, Detroit
ATTN: Regulatory Office
P.O. Box 1027
Detroit, Michigan 48231-1027

Dear Sir:

This is in regard to Department of the Army File No. 05-145-020-0, issued to City of Hobart Parks & Recreation Department on August 15, 2005, to discharge fill for bank stablization project in Lake George at Hobart, Indiana. I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the permit, and mitigation (if required) was completed in accordance with the permit conditions.

The work was completed on: _____
(Date work completed)

_____
(Signature of Permittee) (Date)

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the above address, within 10 days after completion of work.

Please note that your permitted activity is subject to compliance inspection by the U.S. Army Corps of Engineers' representatives. If you fail to comply with this permit you are subject to permit suspension, modification or revocation.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
PUBLIC FRESHWATER LAKE

MAILED MAY 06 2005

APPLICATION # : PL-20064

LAKE : Lake George

APPLICANT : City of Hobart
Mike Farrell
111 Old Ridge Road
Hobart, IN 46342-4357

AGENT : J F New & Associates, Inc
John Richardson
708 Roosevelt Road
Walkerton, IN 46574-1220

AUTHORITY : IC 14-26-2 with 312 IAC 11

DESCRIPTION : A bioengineered seawall will be constructed across 400' of the School City property frontage and across 710' of the Fred Rose Park property frontage. Another bioengineered seawall, consisting of riprap with shrubs planted on three-foot centers, will also be constructed across 975' of the School City property frontage and across 3530' of the Fred Rose Park property frontage. Two (2) 30' wide by 10' long public access sites will be repaired along 60' of the Fred Rose Park frontage. A 3' thick layer of riprap placed over geotextile fabric will be placed at the access sites. Details of the project are contained in information received electronically at the Division of Water on January 28, 2005, and in plans and information received at the Division of Water on February 2, 2005, February 16, 2005, and March 3, 2005.

LOCATION : The project is located within Fred Rose Park and School City property at Hobart, Hobart Township, Lake County
NW¼, NW¼, SW¼, Section 31, T 36N, R 7W, Gary Quadrangle
UTM Coordinates: Downstream 4597287 North, 477962 East

APPROVED BY : _____
James J. Hebenstreit, P.E., Assistant Director
Division of Water

APPROVED ON : May 6, 2005

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: PL- 20064

This signed document constitutes the issuance of a permit by the Department of Natural Resources, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 312 IAC 3-1.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: PL- 20064

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State Law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, IN 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies.These agencies include, but are not limited to:

Agency	Telephone Number
*US Army Corps of Engineers, Detroit District	(313) 226-2218
Lake County Drainage Board	(219) 755-3755
Indiana Department of Environmental Management	(317) 233-8488 or (800) 451-6027
Local city or county planning or zoning commission	

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. Michael W. Neyer, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, IN 46204

Telephone: (317) 232-4160, Toll Free: (877) 928-3755
FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: PL- 20064

PERMIT VALIDITY : This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been completed by May 06, 2007 the permit will become void and a new permit will be required in order to continue work on the project.

This permit becomes effective 18 days after the "MAILED" date shown on the first page. If both a petition for review and a petition for a stay of effectiveness are filed before this permit becomes effective, any part of the permit that is within the scope of the petition for stay is stayed for an additional 15 days.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: January 28, 2005, February 2, 2005, February 16, 2005 and March 3, 2005. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	minimize the movement of resuspended bottom sediment from the immediate project area
(2)	revegetate all bare and disturbed areas landward of the shoreline with a mixture of grasses (excluding all varieties of tall fescue) and legumes as soon as possible upon completion
(3)	all excavated material must be properly spread landward of the shoreline on the property described on page 1 under "DESCRIPTION" or completely removed from the project site such that erosion and off-site sedimentation of the material is prevented
(4)	pursuant to 312 IAC 11-4-2 (h), do not place an impermeable material or structure (including but not limited to concrete, steel, or vinyl retaining walls) directly behind the new seawall approved by this permit

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

VIA CERTIFIED MAIL 7002 0510 0004 2581 4243 June 16, 2005

Mr. Mike Farrell, Superintendent
City of Hobart, Park and Recreation Department
111 East Old Ridge Road
Hobart, IN 46342

Dear Mr. Farrell:

Re: Section 401 Water Quality Certification
Project: Fred Rose Park and School City Shoreline Stabilization
IDEM No.: 2005-083-45-MTM-A
County: Lake

Office of Water Quality staff has reviewed your application for Section 401 Water Quality Certification dated February 8, 2005, and received February 17, 2005. According to the application, you propose to stabilize approximately 4,270 linear feet of the eroding shoreline of Lake George within the limits of Fred Rose Park and stabilize an additional 1,375 linear feet of Lake George shoreline within the limits of School City property. The project will involve the use of coconut fiber logs, reconstructed slope treatment, repair to existing public access and the discharge of 2,818 cubic yards of rock. The project will require the filling of 0.86 acres of Lake George below the ordinary highwater mark of Lake George. The project is located in the SE ¼ of Section 31 and the SW ¼ of Section 32 of Township 36 North and Range 7 West in Hobart, Lake County.

Based on available information, it is the judgment of this office that the proposed project will comply with the applicable provisions of 327 IAC 2 and Sections 301, 302, 303, 306, and 307 of the Clean Water Act if the recipient of the certification complies with the conditions set forth below. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants Section 401 Water Quality Certification for the project described in your application dated February 8, 2005, and received February 17, 2005. Any changes in project design or scope not detailed in the application described above or modified by the conditions below are not authorized by this certification.

GENERAL CONDITIONS:

The recipient of the certification shall:

1. Deposit any dredged material in a contained upland disposal area to prevent sediment runoff to any waterbody. Dispose of all dredged and excavated material according to the requirements of 329 IAC 10, governing Solid Waste Land Disposal Facilities. Your project information may be forwarded to the IDEM Office of Land Quality, Industrial Waste Section for review. Sampling may be required to determine if the dredged sediment is contaminated. Failure to properly dispose of contaminated sediment may result in enforcement action against you.

2. Install erosion control methods prior to any soil disturbance to prevent soil from leaving the construction site. Appropriate erosion control methods include, but are not limited to, straw bale barriers, silt fencing, erosion control blankets, phased construction sequencing, and earthen berms. Monitor and maintain erosion control structures and devices regularly, especially after rain events, until all soils disturbed by construction activities have been permanently stabilized.

3. Clearly mark the construction limits at the project site during construction.

4. Allow the commissioner or an authorized representative of the commissioner (including an authorized contractor), upon the presentation of credentials:

   a. to enter the property of the recipient of the certification;
   b. to have access to and copy at reasonable times any records that must be kept under the conditions of this certification;
   c. to inspect, at reasonable times, any monitoring or operational equipment or method; collection, treatment, pollution management or discharge facility or device; practices required by this certification; and any mitigation wetland site;
   d. to sample or monitor any discharge of pollutants or any mitigation wetland site.

5. Complete all approved discharges no later than two (2) years of the date of issuance of this Section 401 Water Quality Certification. The applicant may request a one (1) year extension to the Section 401 Water Quality Certification by submitting a written request ninety (90) days prior to the deadline stated above. The written request shall contain an account of which discharges and mitigation have been completed and list the reasons an extension is requested.

PROJECT SPECIFIC CONDITIONS:

The recipient of the certification shall:

1. Remove any temporary causeway or other structures used to facilitate construction or access upon completion of construction activities.

2. Install silt fence or other erosion control measures around the perimeter of any wetlands and/or other waterbodies to remain undisturbed at the project site.

3. Allow no construction equipment, temporary run-arounds, coffer dams, causeways, or other such structures to enter or be constructed within the stream, unless specifically stated, depicted, or detailed in the aforementioned correspondence and project plans. A modification of this Section 401 Water Quality Certification is required from this office if any of the aforementioned items are needed for project construction.

This certification does not relieve the recipient of the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person. You may wish to contact the Indiana Department of Natural Resources at 317-232-4160 (toll free at 877-928-3755) concerning the possible requirement of natural freshwater lake or floodway permits. In addition, you may wish to contact IDEM's Stormwater Permits Section at 317-233-1864 concerning the possible need for a 327 IAC 15-5 (Rule 5) permit if you plan to disturb greater than one (1) acre of soil during construction.

This certification does not:
(1) authorize impacts or activities outside the scope of this certification;
(2) authorize any injury to persons or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
(3) convey any property rights of any sort, or any exclusive privileges;
(4) preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or
(5) authorize changes in the plan design detailed in the application.

Failure to comply with the terms and conditions of this Section 401 Water Quality Certification may result in enforcement action against the recipient of the certification. If an enforcement action is pursued, the recipient of the certification could be assessed up to $25,000 per day in civil penalties. The recipient of the certification may also be subject to criminal liability if it is determined that the Section 401 Water Quality Certification was violated willfully or negligently.

This certification is effective eighteen (18) days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18-day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of

the certification within the scope of the petition for stay is stayed for fifteen (15) days, unless or until an Environmental Law Judge further stays the certification in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

   Office of Environmental Adjudication
   100 North Senate Avenue
   IGCN Room N1049
   Indianapolis, IN 46204

3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the certification, decision, or other order for which you seek review by number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

If you have procedural questions regarding filing a petition for review you may contact the Office of Environmental Adjudication at 317-232-8591.

APPENDIX B

DESIGN PLANS

SCHOOL CITY AND FLEMING STREET SHORELINE STABILIZATION DESIGN REPORT

LAKE COUNTY, INDIANA

JFNew
http://www.jfnew.com

Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Cincinnati Office
8080 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3446 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982 fax 317-388-1986

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1680 fax 616-847-9970

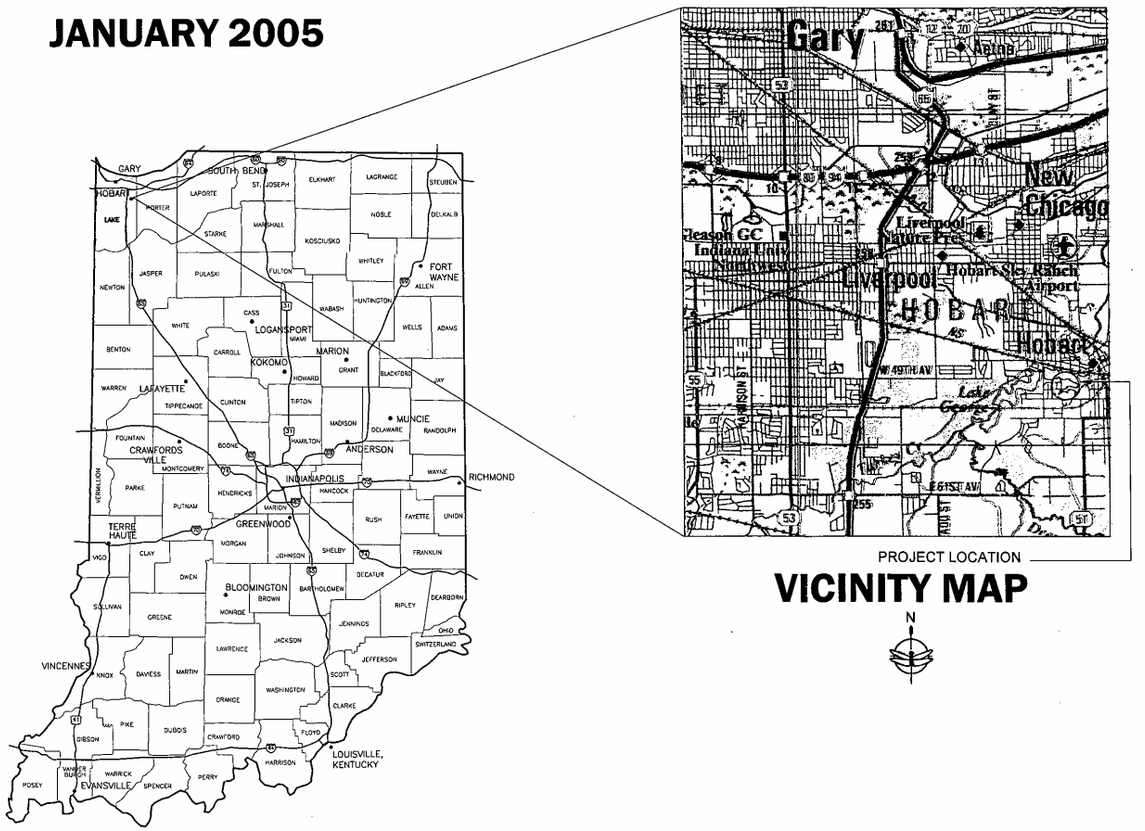
SCHOOL CITY SHORELINE STABILIZATION PROJECT

LAKE COUNTY HOBART, INDIANA

JANUARY 2005

INDEX OF DRAWINGS

SHEET	SHEET DESCRIPTION
1	TITLE SHEET AND SHEET INDEX
2	PLAN VIEW
3	CROSS SECTIONS
4	CROSS SECTIONS
5	TREATMENT A DETAILS
6	TREATMENT B DETAILS
7	TREATMENT CONNECTION DETAILS
8	PIPE OUTLET DETAILS



VICINITY MAP

N

REVISIONS:

Our mission is to provide the highest quality environmental services to our clients while positively impacting the lives of our employees and the conservation of natural resources through prosperity and stewardship.

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana

TITLE SHEET AND SHEET INDEX

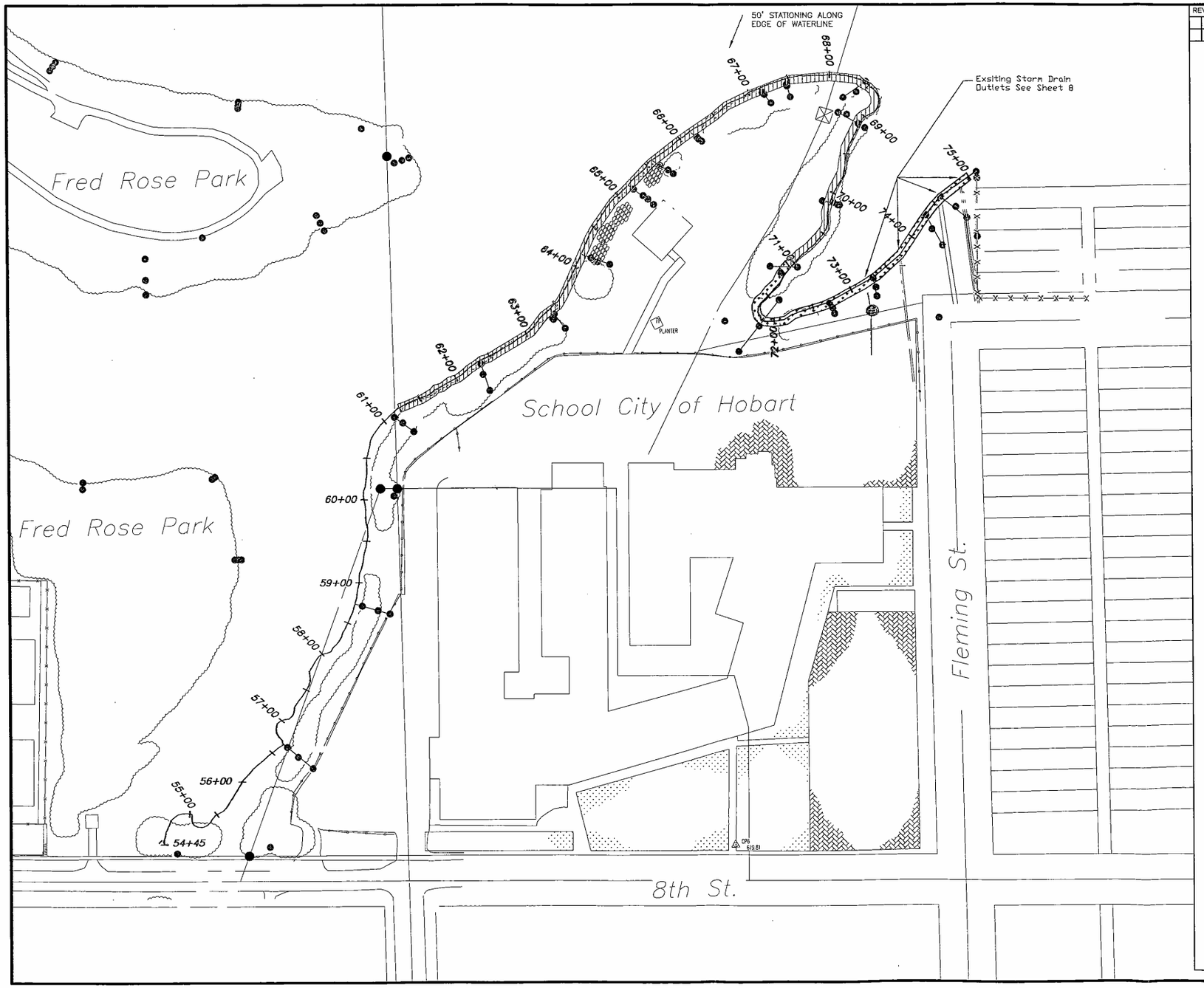
DRAWN BY:	JFH
DESIGNED BY:	
CHECKED BY:	
DATE:	DEC 2004
JOB NO:	030962
SCALE:	AS NOTED

01-COVER.DWG

DRAWING NO.

1

OF 8



REVISIONS:

		SKL
		JAE

NOTES:

1) All areas disturbed during construction of the shoreline stabilization shall be restored to their previous condition as per special provisions.
2) Survey completed by Rowland and Associates, Inc., Angola, Indiana.

LEGEND

- Approximate Shore Line.
- Treatment Type A (See Sheet 4).
- Treatment Type B (See Sheet 5).

N

0 60'

SCALE IN FEET

SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Cincinnati Office
8080 Beckett Center Dr., Suite 226
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513-942-3446 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1692 fax 317-388-1686

Michigan Office
609 South Beacon
Grand Haven, Michigan 49417
616-847-1660 fax 616-847-9970

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana
SITE PLAN

DRAWN BY:	JAE
DESIGNED BY:	JR
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

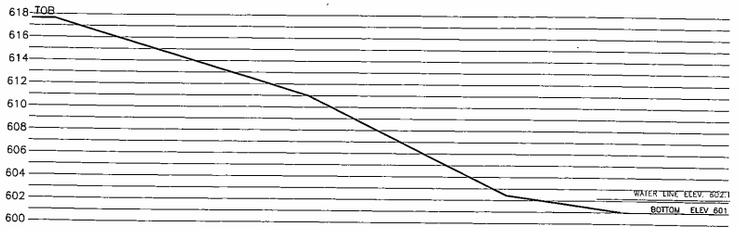
02-SITE PLAN.DWG

DRAWING NO.

2

OF 8

56+66



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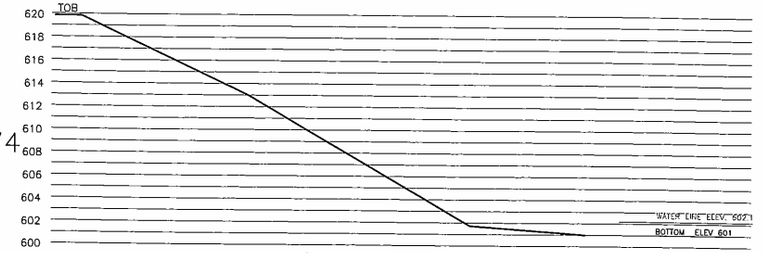

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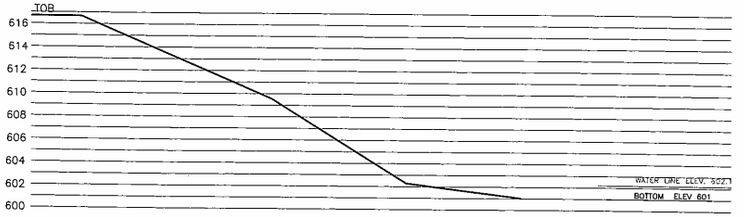

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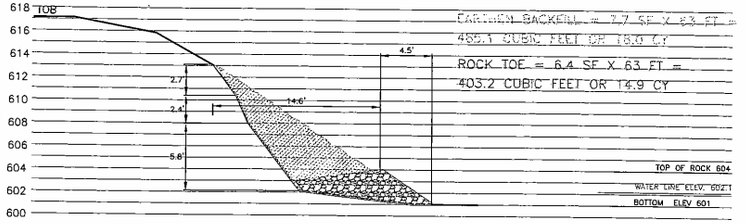
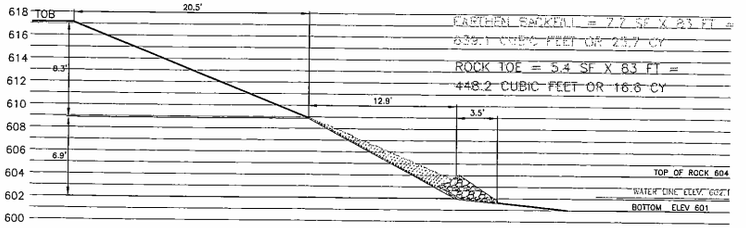


62+36 B



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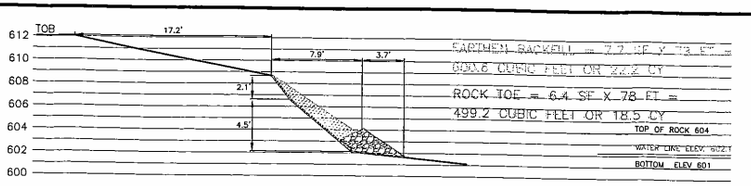

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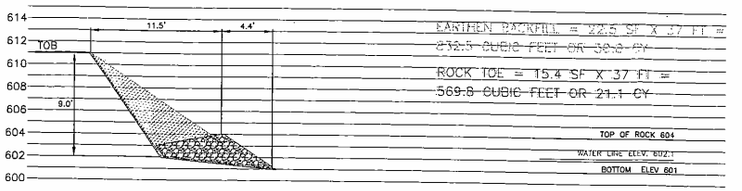

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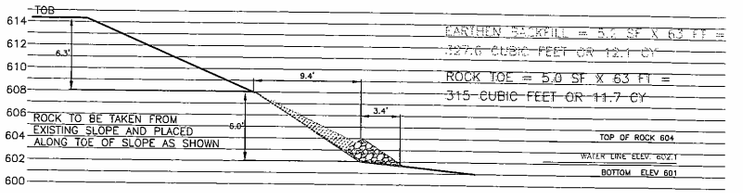
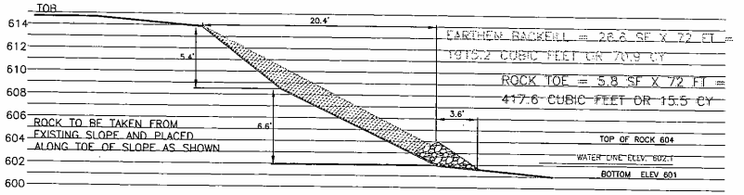


65+17 B



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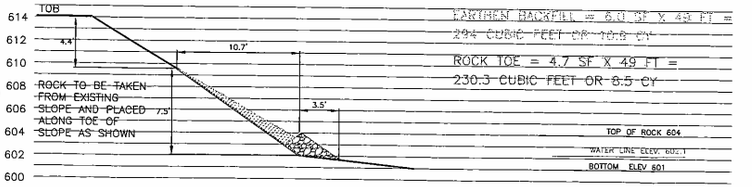
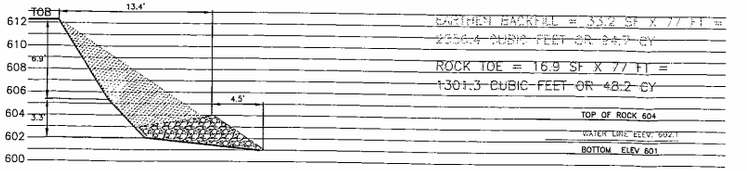


66+14 B



SHEET 3 TOTALS

EARTHEN BACKFILL – TOTAL = 283.3 CY

ROCK TOE – TOTAL = 155.0 CY

HORZ. & VERT.
0 6'
SCALE IN FEET

SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
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Cincinnati Office
8060 Beckett Center Dr., Suite 228
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Michigan Office
800 South Beacon
Grand Haven, Michigan 49417
616-847-1580 fax 616-847-0970

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana
CROSS SECTIONS (CUT AND FILL CALCS)

DRAWN BY:	JAE
DESIGNED BY:	JR
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

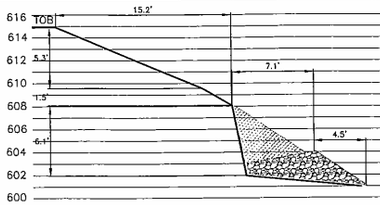
03-04 X SECTIONS.DWG

DRAWING NO.

3

OF 8

67+12 B

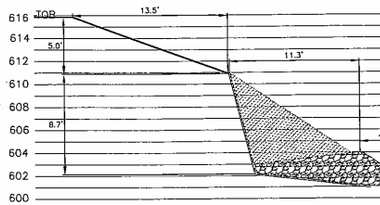


EARTHEN BACKFILL = 14.0 SF X 66 FT = 924 CUBIC FEET OR 34.2 CY

ROCK TOE = 16.8 SF X 66 FT = 1108.8 CUBIC FEET OR 41.1 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

67+46 B

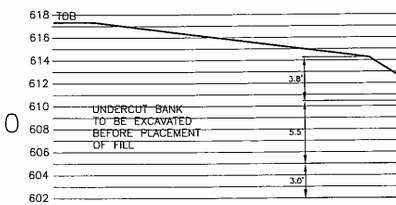


EARTHEN BACKFILL = 34.5 SF X 49 FT = 1690.5 CUBIC FEET OR 62.6 CY

ROCK TOE = 24.0 SF X 49 FT = 1176 CUBIC FEET OR 43.6 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

68+10 B

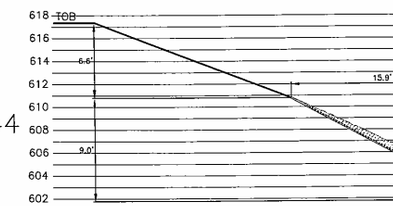


EARTHEN BACKFILL = 25.0 SF X 49 FT = 1225 CUBIC FEET OR 45.4 CY

ROCK TOE = 25.9 SF X 49 FT = 1269.1 CUBIC FEET OR 47.0 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

68+44 B

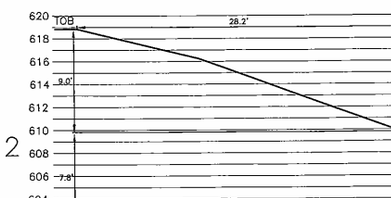


EARTHEN BACKFILL = 8.5 SF X 51 FT = 433.5 CUBIC FEET OR 16.1 CY

ROCK TOE = 5.1 SF X 51 FT = 260.1 CUBIC FEET OR 9.6 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

69+12 B

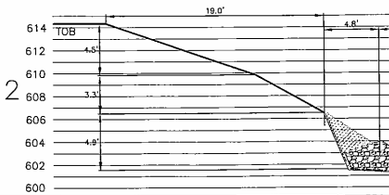


EARTHEN BACKFILL = 7.2 SF X 84 FT = 604.8 CUBIC FEET OR 22.4 CY

ROCK TOE = 5.9 SF X 84 FT = 495.6 CUBIC FEET OR 18.4 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

70+12 B

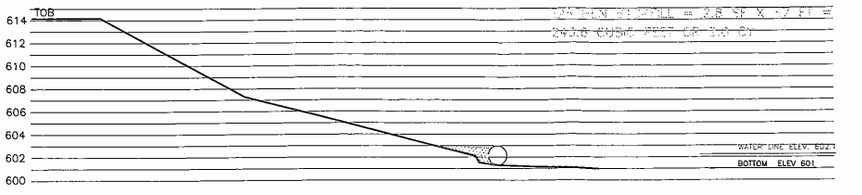


EARTHEN BACKFILL = 5.1 SF X 97 FT = 494.7 CUBIC FEET OR 18.3 CY

ROCK TOE = 11.7 SF X 97 FT = 1134.9 CUBIC FEET OR 42.0 CY

TOP OF ROCK 604
WATER LINE ELEV. 602.1
BOTTOM ELEV 601

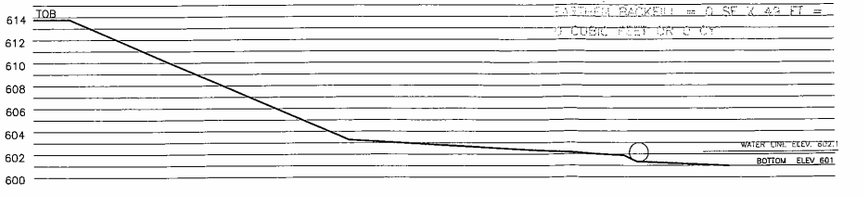
71+06 A



EARTHEN BACKFILL = 2.8 SF X 97 FT = 243.6 CUBIC FEET OR 9.0 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

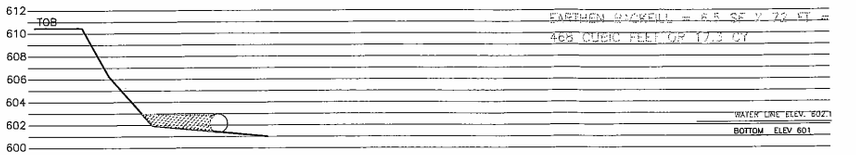
71+86 A



EARTHEN BACKFILL = 0 SF X 42 FT = 0 CUBIC FEET OR 0 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

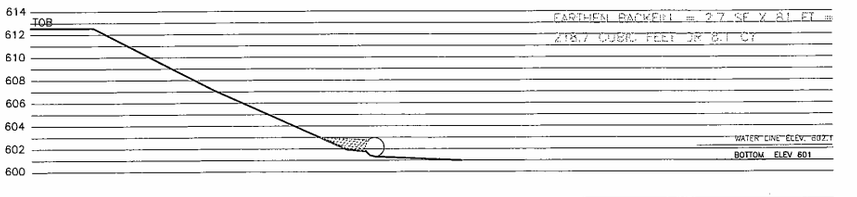
72+69 B



EARTHEN BACKFILL = 6.5 SF X 72 FT = 468 CUBIC FEET OR 17.3 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

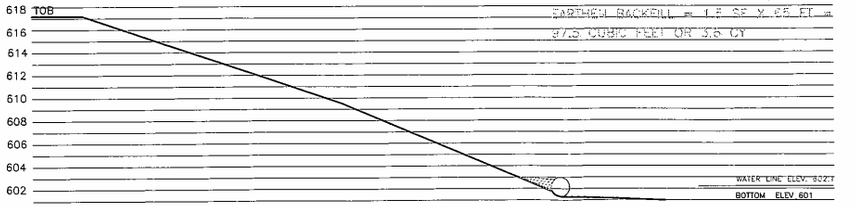
73+29 A



EARTHEN BACKFILL = 2.7 SF X 81 FT = 218.7 CUBIC FEET OR 8.1 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

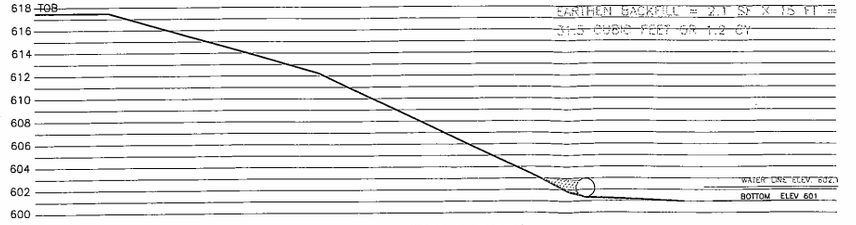
74+30 A



EARTHEN BACKFILL = 1.5 SF X 65 FT = 97.5 CUBIC FEET OR 3.6 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

74+60 A



EARTHEN BACKFILL = 2.1 SF X 15 FT = 31.5 CUBIC FEET OR 1.2 CY

WATER LINE ELEV. 602.1
BOTTOM ELEV 601

SHEET 4 TOTALS

EARTHEN BACKFILL - TOTAL = 238.2 CY

ROCK TOE - TOTAL = 201.7 CY

OVERALL TOTALS

EARTHEN BACKFILL - TOTAL = 521.5 CY

ROCK TOE - TOTAL = 356.7 CY

HORZ. & VERT.
0 6'
SCALE IN FEET

SCALE VERIFICATION
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317-388-1982 fax 317-388-1988

Michigan Office
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616-847-1660 fax 616-847-0070

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana

CROSS SECTIONS (CUT AND FILL CALCS)

DRAWN BY:	JAE
DESIGNED BY:	JR
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

03-04 X SECTIONS.DWG

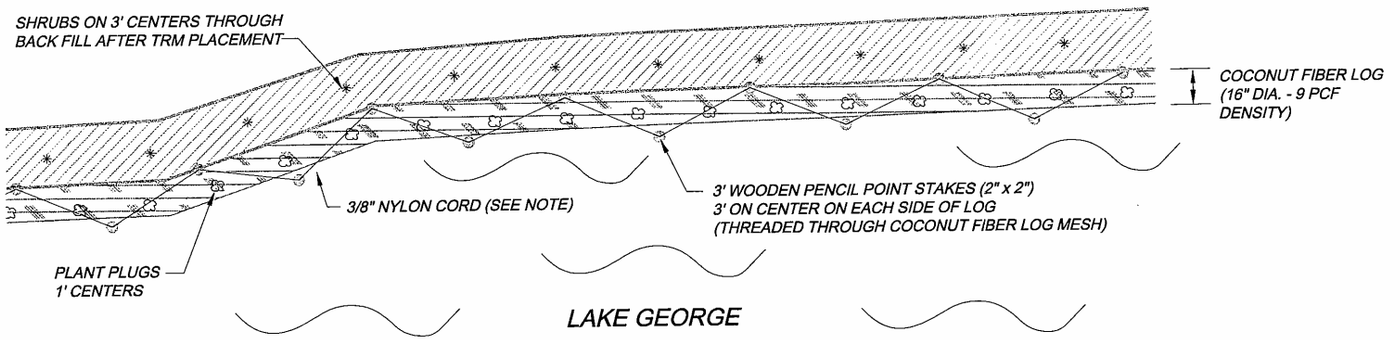
DRAWING NO.

4

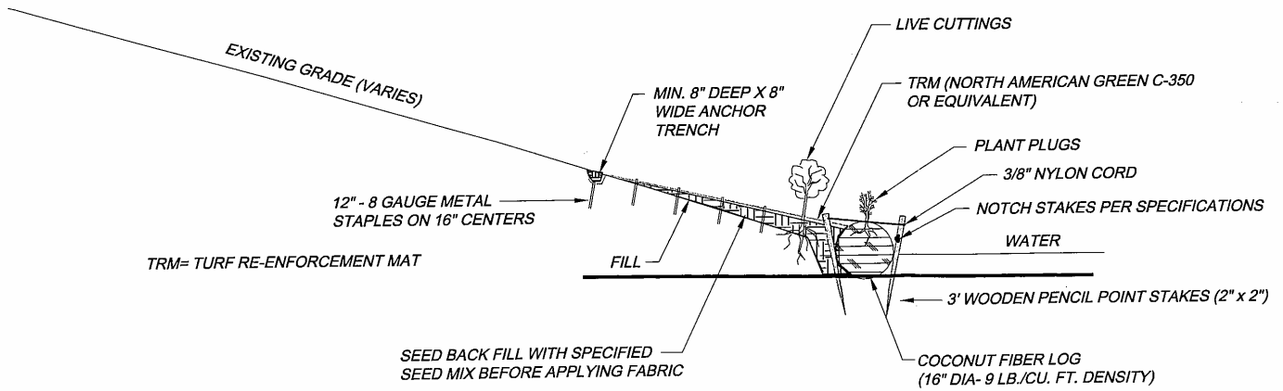
OF 8

REVISIONS:

TYPICAL AERIAL VIEW
(TREATMENT LENGTH VARIES)



TYPICAL CROSS SECTION



LIVE STAKES (SEE SPECIFICATIONS)

Common Name:	Scientific Name:
Buttonbush	*Cephalanthus occidentalis*
Silky Dogwood	*Cornus amomum*

PLUGS (SEE SPECIFICATIONS)

Common Name:	Scientific Name:
Blueflag	*Iris versicolor*
Blueflag Iris	*Iris virginica*
Blue-joint Grass	*Calamogrostis canadensis*
Buttonbush	*Cephalanthus occidentalis*
Cardinal Flower	*Lobelia cardinalis*
Great Blue Lobelia	*Lobelia siphilitica*
Giant Burreed	*Sparganium eurycarpum*
Hibiscus	*Hibiscus laevis*
Hop Sedge	*Carex lupulina*
Prairie Cordgrass	*Spartina pectinate*
River Bulrush	*Scirpus fluviatilis*
Soft-stem Bulrush	*Scirpus validus*
Swamp Dock	*Rumex verticillatus*
Swamp Milkweed	*Asclepias incarnata*
Sweetflag	*Acorus calamus*
Uptight Sedge	*Carex stricta*

NOTES:

1) This treatment to be applied from Station 71+05 to 75+00.

2) See special provisions for installation details.

3) Nylon cord shall be knotted at every fourth stake.

0 2'
SCALE IN FEET

SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

Corporate Office
706 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Cincinnati Office
8060 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3445 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6940 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982 fax 317-388-1986

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1660 fax 616-847-9970

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana
TREATMENT A DETAILS

DRAWN BY:	JAE
DESIGNED BY:	
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

05-TREATMENT A.DWG

DRAWING NO.

5

OF 8

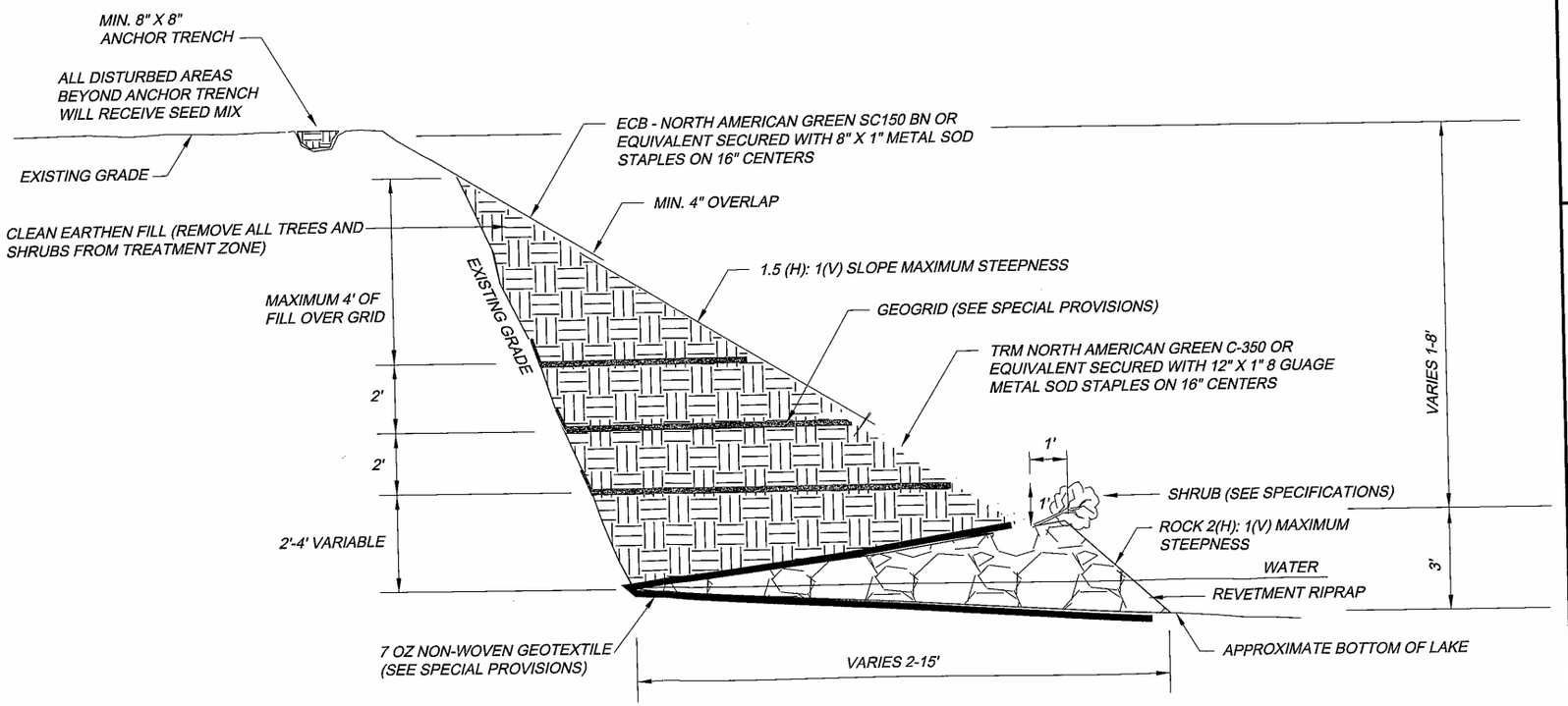
SEED LIST FOR SLOPE (SEE SPECIFICATIONS)

Common Name:	Scientific Name:
Annual Rye	*Lolium multiflorum*
Arrow-leaved Aster	*Aster sagittifolius*
Awl-fruited Ovai Sedge	*Carex tribuloides*
Beardtongue	*Penstemon digitalis*
Black-eyed Susan	*Rudbeckia hirta*
Blue Joint Grass	*Calamagrostis canadensis*
Bottlebrush Grass	*Hystrix patula*
Brown-Eyed Susan	*Rudbeckia triliffa*
Brown Fox Sedge	*Carex vulpinoidea*
Butterfly Milkweed	*Asclepias tuberosa*
Canada Wild Rye	*Elymus canadensis*
Common Oak Sedge	*Carex pensylvanica (plugs)*
Common Spiderwort	*Tradescantia ohiensis*
Crested Oval Sedge	*Carex cristatella*
Culver's Rook	*Veronicistrum virginicum*
False Sunflower	*Heliopsis helianthoides*
Golden Alexcinders	*Zizac aurea*
Heath Aster	*Aster ericoides*
Indian Grass	*Sorgastrum nutans*
Little Bluestem	*Andropogon scoparius*
Nodding Fescue	*Festuca obstusa*
Prairie Cord Grass	*Spartina pectinata*
Purple Prairie Clover	*Petalostemum purpureum*
Rosinweed	*Silphium integrifolium*
Rough Blazing Star	*Liatris aspera*
Roundheaded Bush Clover	*Lespedeza capitata*
Seed Oats	*Avena sativa*
Showy Goldenrod	*Solidago speciosa*
Showy Tick-Trefoil	*Desmodium canadense*
Side Oats Grama	*Bouteloua curtipendula*
Smooth Blue Aster	*Aster laevis*
Smooth Beard Tongue	*Penstemon calycrosus*
Switch Grass	*Panicum virgatum*
Thimbleweed	*Anenome virginiana*
Thin Grass	*Agrostis perenncas*
Virginia Rye	*Elymus virginicus*
Wild Bergamot	*Monarda fistulosa*
Wild Columbine	*Aguilegia canedensis*
Wild White Indigo	*Baptisia leucantha*
Wingstem	*Actinomeris allernifolic*
Yellow Coneflower	*Ratibida pinnata*

NOTES:

1) This treatment to be applied from Station 61+25 to 71+05.
2) Rock shall be placed to a minimum height of 3' above the lake bottom at the toe of the slope.
3) Fill shall be compacted in 6" layers to 95% of standard proctor tests.
4) Geogrid shall be placed on every 2' layer of compacted fill until a maximum of 4' of fill remains above grid.
5) TRM = Turf Reinforcement Mat
   ECB = Erosion Control Blanket

TYPICAL CROSS SECTION



REVISIONS:

0 2'
SCALE IN FEET

SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

Corporate Office
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574-586-3400 fax 574-586-3446

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West Chester, Ohio 45069
513-942-3446 fax 513-942-3447

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1378 Main Street
Crete, Illinois 60417
708-367-1133 fax 708-367-1132

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1992 fax 317-388-1998

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1880 fax 616-847-9070

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana
TREATMENT B DETAILS

DRAWN BY:	JAE
DESIGNED BY:	JR
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

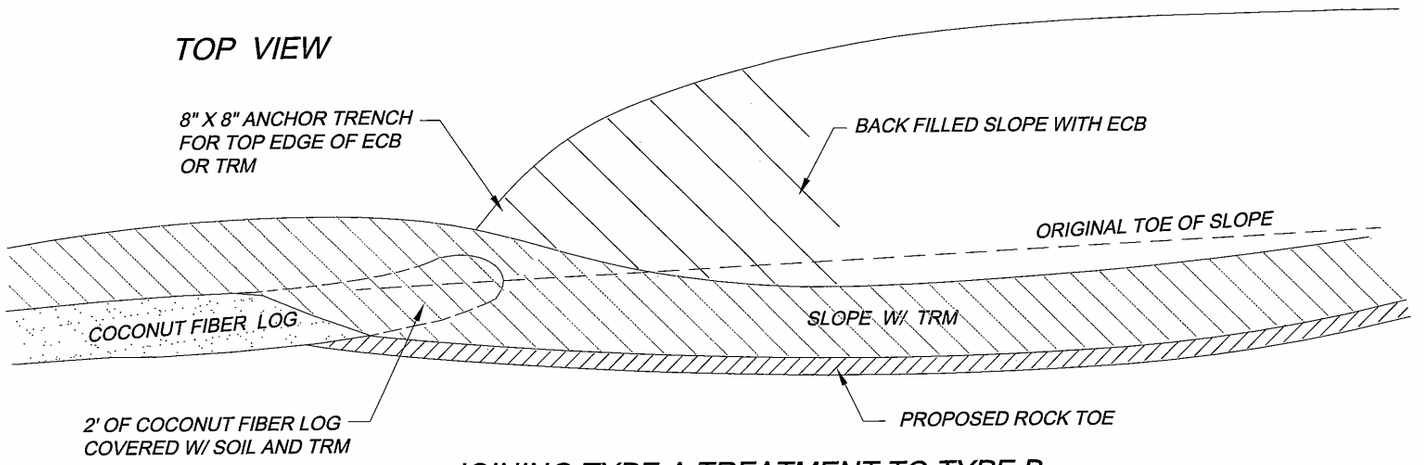
06-TREATMENT B.DWG

DRAWING NO.

6

OF 8

REVISIONS:



JOINING TYPE A TREATMENT TO TYPE B

0 4'
SCALE IN FEET

SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

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708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Cincinnati Office
9080 Beckett Center Dr., Suite 208
West Chester, Ohio 45069
513-942-3448 fax 513-942-3447

Illinois Office
1370 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
8640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1962 fax 317-388-1966

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1580 fax 616-847-3670

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana

TREATMENT CONNECTION DETAILS

DRAWN BY:	JAE
DESIGNED BY:	
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

07-TREATMENT JOINTS.DWG

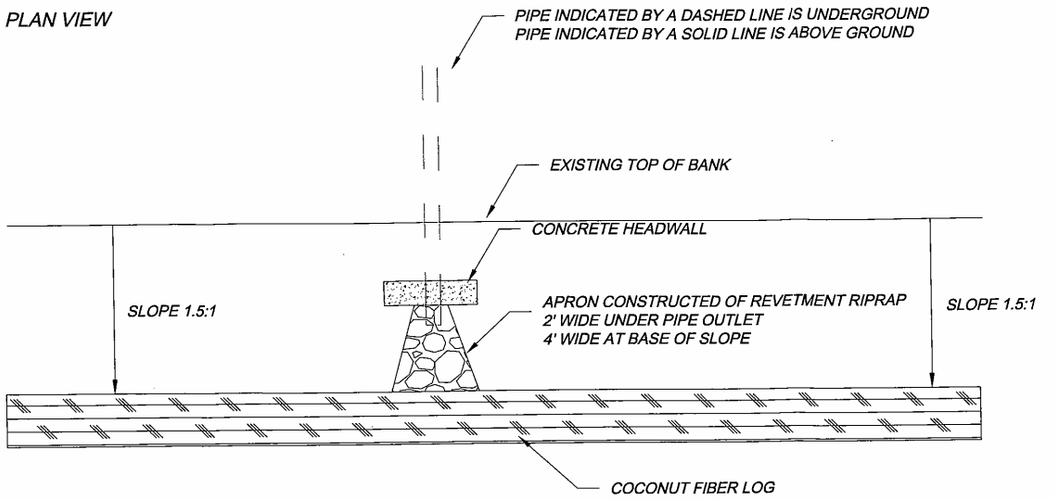
DRAWING NO.

7

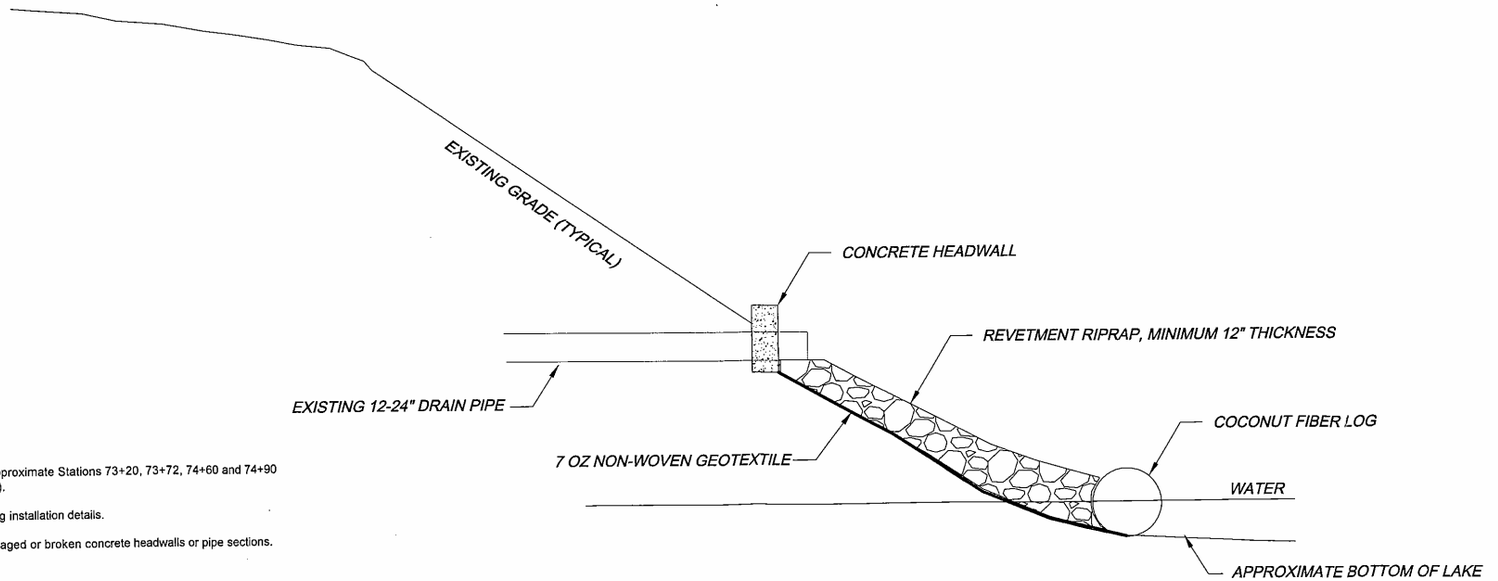
OF 8

REVISIONS:

TYPICAL PLAN VIEW



TYPICAL CROSS SECTION



NOTES:

1) This treatment to be applied at approximate Stations 73+20, 73+72, 74+60 and 74+90 (contractor to field verify locations).
2) See sheet 5 for Cocount Fiber Log installation details.
3) Contractor shall remove any damaged or broken concrete headwalls or pipe sections.

0 2'
SCALE IN FEET

SCALE VERIFICATION:
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

Corporate Office
706 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3448

Cincinnati Office
8080 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3416 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6940 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1962 fax 317-388-1966

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1660 fax 616-847-9970

JFNew

School City Shoreline Stabilization
City of Hobart
Lake County, Indiana
PIPE OUTLET DETAILS

DRAWN BY:	SJP
DESIGNED BY:	JBR
CHECKED BY:	
DATE:	JAN 2005
JOB NO:	030962
SCALE:	AS NOTED

08-PIPE OUTLET.DWG

DRAWING NO.

8

OF 8

APPENDIX C

SPECIFICATIONS

SCHOOL CITY AND FLEMING STREET SHORELINE STABILIZATION DESIGN REPORT

LAKE COUNTY, INDIANA

SPECIAL PROVISIONS

BANK STABILIZATION
FRED ROSE AND JERRY PAVESE PARKS
HOBART, INDIANA

JANUARY 21, 2005

SECTION SS01
GENERAL INFORMATION

PART 1 - WORK COVERED BY CONTRACT DOCUMENTS

The work includes shoreline stabilization work along the entire Lake George shoreline of Jerry Pavese and Fred Rose Parks in Hobart, Lake County, Indiana and all other work as described in these specifications and shown on the project drawings.

Phase 1 of the project is located along the north shoreline of Lake George and within the boundaries of Jerry Pavese Park, Hobart, Indiana.

Phase II of the project includes the entire Lake George shoreline located within the boundaries of Fred Rose Park, Hobart, Indiana.

The Contractor shall perform all work required to complete the project in accordance with the contract documents and these specifications.

PART 2 - BID

The Base Bid shall include all work and requirements indicated by the Bidding Documents. The Contractor shall not be allowed extra compensation by reason of any matter or thing concerning which the Contractor could have fully informed himself/herself prior to bidding. No verbal agreement, understanding or conversation with an agent or employee of the Owner, either before or after the execution of the contract, shall affect or modify the terms or obligations herein contained.

PART 3 - REMEDIATION ALLOWANCE

The Contractor shall include an allowance of **$2,000** in the Base Bid for Owner-directed remediation of unforeseen constraints.

Such constraints may include but are not necessarily limited to unforeseen subsurface conditions particular to this construction site; improperly recorded or unrecorded physical properties and conditions at the site; obstruction of or delays to reasonable work sequences by the Owner: uncommon adverse weather or site conditions; and conflict within or omissions from the Contract Documents.

All remediation work shall be proposed to and authorized by the Superintendent of the Hobart Parks and Recreation Department prior to execution, jointly documented by the Contractor and Designer, and recorded in Contractor's as-built plans and Designer's project record documents.

PART 4 - COMMENCEMENT AND COMPLETION OF WORK

The Contractor shall commence work as directed by the City of Hobart after the date of the Notice to Proceed.

All work required by the Contract Documents shall be completed within **90 calendar days** after the commencement of the work with the exception of seasonal limitation for planting. Project shall be open for 120 calendar days following completion of the work to evaluate plant growth.

PART 5 - SUBMISSION OF INFORMATION

Submit the following information with the initial bid or when requested by the Owner:

Designation of the work to be performed by the Contractor with his own forces.

List of Subcontractors and their designated work.

List of manufacturers and suppliers of specified materials to be used.

Designation of the source of any fill material for the project. If the source is anything other than a pre-existing borrow pit, the submittal shall include a map (United States Geological Survey topographic map preferred) showing the location. This submittal must be received at least 21 days prior to any excavation occurring at the fill material site.

PART 6 - WORKING HOURS

The Contractor shall perform all construction activity on Monday thru Friday, excluding state holidays, between the hours of 7:30 a.m. and 5:00 p.m, unless previous arrangements are made with the Owner.

All work performed at other times shall be only by approval from the Owner, confirmed in writing, and shall not constitute a change in the contract amount.

PART 7 - EXISTING SITE CONDITIONS

Data on the drawings pertaining to present conditions, dimensions, type of construction, obstructions on or near site, location of utilities, etc. have been obtained from sources believed reliable, but accuracy of such data is not guaranteed and is furnished solely for accommodation of the Contractor.

The Contractor shall, prior to excavating, verify the location of all buried utilities, including buried power lines.

PART 8 - CONSTRUCTION AND STORAGE AREA

The Contractor shall confine the construction operations and storage of materials within an area approved by the Owner.

PART 9 - ROADWAY PROTECTION

The Contractor shall, at his expense, be responsible to repair any and all damage to the property's roads and drainage structures caused by his equipment and/or personnel.

PART 10 - ARCHEOLOGICAL AND HISTORICAL ARTIFACTS

If any objects are uncovered during construction that could possibly be of archeological or historical importance, this shall be immediately reported to the Owner. Work at that spot shall not proceed further until the Owner has evaluated the object and the area where it was found and approved continuation of the work.

If any construction time is lost due to such objects being found, an equal number of calendar days will be added to the project completion time given in the specifications.

PART 11 - SALVAGE RIGHTS

Unless stated otherwise in these specifications or on the plans, all equipment and materials removed as part of this project and not being reused shall become the property of the Contractor and removed from the site.

PART 12 - SITE ACCESS PRIOR TO BIDDING

The project site is a public park, therefore, bidders may obtain access during open park hours.

PART 13 - PERMITS

Owner shall obtain all other permits that relate to the completed project. Contractor shall be responsible to post and maintain required permits at the construction site.

PART 14 - SECURITY

Contractor is responsible for the security of his equipment and work.

END OF SECTION

SECTION SS02
CLEARING AND GRUBBING

PART 1 - DESCRIPTION

This work shall consist of clearing, grubbing, removing, and disposing of all vegetation and debris within the construction limits of this project except those objects that are designated to remain or are to be removed or salvaged in accordance with other sections of these specifications. This work shall include the prevention of injury to all vegetation or other objects designated to remain.

PART 2 – MATERIALS (none)

PART 3 - CONSTRUCTION REQUIREMENTS

A. The Contractor is responsible for identifying access areas and work area limits within the park boundaries to the satisfaction of the owner. Vegetation not directly impacted by the work or identified on the plans as "DO NOT DISTURB" shall be preserved by the Contractor unless directed otherwise by the Owner or Owner's Representative. In addition, trees greater than six inches D.B.H. shall not be removed unless otherwise instructed by the Owner or Owner's Representative.

B. Any damage to natural terrain, vegetation, trees, shrubs, plants, or other objects designated to remain shall be repaired or replaced with no additional payment. Tree wound dressing for cut or scarred surfaces of trees or shrubs shall be in accordance with Section 913.09 (c) of Indiana Department of Highways Specifications (1988 or latest edition).

C. Surface objects, trees, stumps, roots, rocks, and other protruding objects not designated to remain shall be cleared and grubbed as needed to complete the contracted work. Generally, clearing will be limited to the eroding face of the embankment and work footprint. Undisturbed stumps, roots, and nonperishable solid objects may be left provided that they are at or below the final grade on slopes and embankments. Existing fallen trees in the waterway shall be moved lakeward of the area required to reconstruct the embankment or cut up and hauled off-site. The Contractor shall not be permitted to bury cleared materials on the project site.

D. Burning of debris shall not be permitted on the project site.

E. Perishable materials and debris shall be removed from the project site and disposed of in an approved disposal facility located off the site. Written permission shall be obtained from the property Owner on whose property the materials and debris are to be placed or a receipt obtained from disposal at a sanitary landfill. Materials and debris shall not be disposed of in low-lying areas or wetlands.

PART 4 – PAYMENT

There will be no separate payment for clearing and grubbing or hauling and disposing of debris. The cost of this work is to be included in the total contract price.

END OF SECTION

SECTION SS03
ROCK TOE PROTECTION

PART 1 - DESCRIPTION

This Work shall include materials and installation of geotextile filter fabric, riprap, and other stone in accordance with these specifications and the drawings, cross sections, and typical cross sections, unless otherwise directed by the Engineer.

PART 2 - MATERIALS

A. Stone type A shall be revetment riprap with an average diameter of 6 inches or greater.

B. Stone type B shall be #2 stone with an average diameter of 2 inches.

C. Stone Type C shall be #53 crushed limestone.

D. Revetment riprap and gravel material shall comply with all applicable paragraphs of the Indiana Department of Transportation Standard Specifications, latest edition. Stone shall not include broken concrete, masonry, or other debris removed from old structures or roadways.

E. Filter fabric shall be 7 ounces per square yard non-woven geotextile cloth.

PART 3 - CONSTRUCTION REQUIREMENTS

A. Filter fabric shall be placed on the lake bottom and the excavated shoreline between the soil surface and the rock. The fabric shall be installed parallel to the shoreline and temporarily anchored using wood or metal stakes. The fabric shall cover all exposed soil that, according to the plans, will be covered with rock. Filter Fabric shall also be used to form a barrier between the rock and constructed embankment above the rock base. To prevent tearing, rock shall not be dropped onto the fabric from more than three feet. If tears occur the contractor shall cover the tear with another piece of filter fabric.

B. The revetment riprap shall be placed at locations shown on the plans for Treatment B and Treatment C or as directed by the Owner or Owners Representative. It shall be placed to produce a surface of approximate regularity but need not necessarily be hand placed. The riprap will be placed first to form a stable foundation and then be tamped in place with the backhoe or compactor to the grades and elevations shown on the plans. The finished surface shall vary no more than 4 inches from a true plane. Voids shall be reduced to less than five percent of the rock volume. If necessary to eliminate voids, #2 stone can be added.

C. Areas labeled on the plans as having Treatment Type C shall be finish graded at the elevations and locations shown on the plans by placing a 2-inch layer of #53 stone over a continuous layer of compacted #2 stone. The #2 stone shall first be compacted into

the revetment riprap to create a uniform surface with less than 5 percent voids. The contractor shall then compact the #53 stone to 95 percent standard proctor at the elevations shown on the plans.

PART 4 - PAYMENT

There will be no separate payment for furnishing, hauling, or installation of stone. The cost of this work is to be included in the total contract price.

END OF SECTION

SECTION SS04
EMBANKMENT CONSTRUCTION

PART 1 - DESCRIPTION

This work shall include furnishing geogrid materials and installation of soil lifts in accordance with these Specifications and in conformance with the Plans, typical cross sections and specific cross sections for Treatment B, unless otherwise directed by the Owner or Owner's Representative.

PART 2 - MATERIALS

A. The TRM and ECB shall meet the specifications outlined in Section SS07: Part 2-Materials.

B. The geogrid shall be a woven polyester grid with a latex coating. Tensile strength at 5% strain shall be greater than 1200 pounds per square foot in the roll direction of the fabric. The geogrid shall be Mirafi 5XT or equivalent.

C. Embankment fill shall be clean earthen fill free of roots, rocks and other debris over one (1) inch in diameter. Earthen fill shall consist of a minimum of 20% clay and have no more than 10% organic matter. Earthen fill can be obtained from the City of Hobart, dredge spoil basin borrow stockpile.

D. Staples shall be 8 gauge metal staples that are one (1) inch wide by 12 inches long or an equal approved by the Owner's Representative.

PART 3 - CONSTRUCTION REQUIREMENTS

A. The Contractor shall place the non-woven geotextile filter fabric (see Special Provision SS03) on top of the compacted revetment riprap.

B. The Contractor shall place the specified shrubs over the filter fabric, on three-foot centers or closer. The root collar shall be placed approximately 12-16 inches from the outside face of the revetment riprap so that the entire root mass will be buried under the constructed embankment. Shrubs shall not be left without earthen cover for more than 15 minutes.

C. The Contractor shall roll out the Turf Reinforcement Mat (TRM) over the top of the trees and front face of the revetment riprap so that the fabric is upside down and has approximately 2.5 feet of the landward edge of the fabric on top of the rock, filter fabric and trees. Stretch the fabric out to eliminate large wrinkles and creases.

D. The Contractor shall then add earthen fill to a height of 8-12 inches and compact the material into a six-inch lift. Compaction shall be to 95% standard proctor. Repeat six-inch lift fill until the deepest portion of the compacted fill is 2-feet deep.

E. The Contractor shall install the geogrid perpendicular to the slope by cutting the roll across the grain in lengths equal to the top width of the compacted fill. Geogrid shall extend to existing original grade. The geogrid shall be stretched so that no wrinkles or folds are present and stapled into place with 12-inch metal staples.

F. The Contractor shall repeat step D above by filling an additional 2 feet in compacted six-inch lifts. The contractor shall then add another layer of geogrid to the embankment as in step E.

G. The contractor shall repeat steps D and E until the compacted fill reaches 4 feet in elevation above the front face of the revetment riprap. The Contractor shall then prepare the face of the compacted fill on a 1.5(H):1(V) face for seeding. See SS05 part 3(B).

H. The Contractor shall seed the face of the compacted fill material in accordance with Special Provision SS05.

I. The Contractor shall then install the TRM on the seeded face as per Special Provision SS07 keying the top 1-foot of the TRM into the constructed embankment or top of bank.

J. Providing the TRM does not reach the top of bank, the contractor shall continue embankment fill in six-inch lifts installing geogrid every 2-feet in elevation and maintaining the 1.5(H):1(V) slope. The use of geogrid shall be discontinued when the fill is less then 3 feet from the top of bank. When total embankment fill is less than 3 feet, geogrid installation is not necessary.

K. The Contractor shall prepare and seed the embankment slope and install ECB as per Special Provision SS07, keying the top edge of the blanket into the original slope. All disturbed areas above the constructed embankment shall be seeded with the specified seed mix and ECB shall be installed.

PART 4 - PAYMENT

There will be no separate payment for furnishing and installing earthen fill, geogrid or incidentals necessary to meet these specifications. The cost of this work is to be included in the total contract price.

END OF SECTION

SECTION SS05
SEED MIXTURE

PART 1 - DESCRIPTION

This work consists of furnishing and applying the specified seed mixture to all areas of reconstructed embankment in accordance with these specifications and the plans. The work also includes seeding adjacent areas that are disturbed during the construction process.

PART 2 - MATERIALS

The seed mixture shall be acquired from local seed dealers when possible. The contractor shall measure the total area for seeding which shall include all potential disturbed soil areas adjacent to the reconstructed embankments. The following chart lists the composition of Seed Mixture. All substitutions shall be approved by the Design Engineer.

Scientific Name	**Common Name**	**oz/ac**
Temporary Grasses		
Avena sativa	Seed Oats	360
Lolium multiflorum	Annual Rye	100
Permanent Grasses, Rushes, and Sedges		
Andropogon scoparius	Little Bluestem	16
Bouteloua curtipendula	Side Oats Grama	8.0
Calamagrostis canadensis	Blue-joint Grass	8.0
Carex cristatella	Crested Oval Sedge	2.0
Carex normalis	Spreading Oval Sedge	2.0
Carex tribuloides	Awl-fruited Sedge	2.0
Carex vulpinoidea	Brown Fox Sedge	4.0
Elymus canadensis	Canada Wild Rye	8.0
Elymus virginicus	Virginia Wild Rye	8.0
Panicum virgatum	Switchgrass	4.0
Sorghastrum nutans	Indian Grass	8.0
Spartina pectinata	Prairie Cordgrass	8.0
Forbs		
Anenome cylindrica	Thimbleweed	1.5
Asclepias tuberosa	Butterfly Weed	1.5
Aster laevis	Smooth Blue Aster	0.75
Aster ericoides	Heath Aster	0.5
Aster sagittifolius	Arrow-leaved Aster	0.75
Baptesia leucantha	Wild White Indigo	1.5
Heliopsis helianthoides	False Sunflower	1.0
Liatris aspera	Rough Blazing Star	2.5

Scientific Name	Common Name	oz/ac
Lespedeza capitata	Roundheaded Bush Clover	2.0
Monarda fistulosa	Wild Bergamot	0.5
Penstemon digitalis	Foxglove Beard Tongue	0.5
Petalostemum purpureum	Purple Prairie Clover	0.5
Ratibida pinnata	Yellow Coneflower	3.0
Rudbeckia hirta	Black-Eyed Susan	1.5
Silphium integrifolium	Rosinweed	3.0
Solidago speciosa	Showy Goldenrod	1.0

PART 3 - CONSTRUCTION REQUIREMENTS

A. SEED PURCHACE, DELIVERY AND STORAGE

All seed shall be Pure Live Seed (PLS) at the amounts specified. A label shall be affixed to each seed lot specifying the PLS content. Seed amounts shall be adjusted to meet 100% PLS. Delivery of seed shall be timed to coordinate closely with the planting time. If the seed needs to be held for more than one day, the Contractor shall store the seed in a cool, dry place until the seed can be applied. Minimize the need to hold seed over from one year to the next. Seed shall be shipped, stored and handled in a manner that will ensure protection from damage and to maintain dormancy until planted.

B. SITE PREPARATION

Soil shall be loose friable topsoil for a minimum of 1 inch over the compacted fill. The soils shall be free of roots, rocks and other debris over 1 inch in diameter. Soils shall be raked before applying seed.

C. PLANTING

Seed shall be sewn by hand or hand operated cyclone seeder. The seeding equipment shall be calibrated to sow the seeds at the rates and proportions as specified in the plans. Seed shall not be covered with more than 1/4 inch of soil.

D. PLANTING TIME

The seeding shall take place between September 15 and June 30. Written permission from the Design Engineer will be required to vary from this planting window.

PART 4 – WARRANTY

At least 75% ground cover shall be achieved at the end of the first growing season. No more than 10% (by areal cover) of the seeded areas will be dominated by perennial weedy species. If these standards are not met, the Contractor shall be responsible for supplemental seeding as approved by the Engineer. Percent ground cover shall be determined by the Engineer or by the City's designated monitoring consultant.

PART 5 – PAYMENT

There will be no separate payment for seeding. The cost of furnishing and installing seed shall be included in the entire cost of the project.

END OF SECTION

SECTION SS06
SHRUBS

PART 1 - DESCRIPTION

This work shall consist of furnishing and installing shrubs within Treatment Type A and Treatment Type B in the locations and numbers shown on the plans.

PART 2 - MATERIALS

The following shrubs shall be accepted for the project. All shrubs shall be bare root or potted stock. Shrubs shall be a minimum of 0.25 inches in diameter at the root collar and 12 inches high as measured from the root collar.

Scientific Name	Common Name
Amelanchier arborea	Serviceberry
Cephalanthus occidentalis	Buttonbush
Cornus amonum	Silky Dogwood
Viburnum prunifolium	Blackhaw Viburnum

PART 3 - CONSTRUCTION REQUIREMENTS

A. All shrubs shall be purchased the same year they are to be planted. If shrubs need to be held for more than three days, the Contractor shall store them in a cool, moist environment until they can be planted. Shrubs shall be shipped, stored and handled in a manner that will ensure protection from damage. This includes frequent watering to maintain moist roots systems if stored at the job site.

The shrub planting shall take place between September 15 and June 30. Written permission from the Design Engineer will be required to vary from this planting window.

B. The shrubs shall be installed in Treatment A after installation of the required Turf Reinforcement Mat (TRM) and Erosion Control Blanket (ECB). The shrubs shall be installed by making an " X " shaped cut in the TRM or ECB to excavate the planting hole. The shrubs shall be installed on a minimum spacing of 3 feet. The Contractor shall excavate planting holes to two times the diameter of the root ball and as deep as the root as measured from the root collar down. Roots longer than 12 inches can be pruned with a sharp pruning shears in accordance with INDOT specification 622.07. The seedlings shall be placed into the hole with the roots hanging free and not turned up at the bottom of the hole. The hole shall be backfilled with topsoil and compacted in accordance with INDOT specification 622.08. The Contractor shall than staple the loose TRM or ECB back over the exposed soil using a minimum of four staples in accordance with the Special Provision for Erosion Control Blankets. The Contractor shall be in accordance with all survival requirements for the seedlings.

C. Shrubs to be installed in Treatment Type B will be installed on top of the filter fabric that overlies the compacted revetment riprap. The shrubs shall be installed so that the entire root ball up to the collar will be buried under the TRM and subsequent fill for embankment construction (see Special Provision for Embankment Construction).

PART 4 - WARRANTY

The Contractor shall guarantee at least 75% survival after year one. The shrubs will be monitored by the Engineer or by the City of Hobart's designated consultant one year after planting occurs. The computation of survival percentage shall be based on the number of healthy live shrubs per two 100-foot random sample transects along the planting zones shown on the plans. If the percentage of healthy live shrubs falls below 25 per 100 feet within the planting zones, then the Contractor shall be required to plant additional shrubs to bring the density back to one shrub every three feet at no additional cost to the City.

PART 5 - PAYMENT

There will be no separate payment for shrubs. The cost of furnishing and installing shrubs shall be included in the entire cost of the project.

END OF SECTION

SECTION SS07
EROSION CONTROL BLANKETS

PART 1 - DESCRIPTION

This work shall consist of furnishing and installing Erosion Control Blankets (ECB) and Turf Reinforcement Mats (TRM) for all shoreline stabilization treatment types as shown on the engineering plans.

ECB or TRM shall be installed on all embankments having exposed or disturbed soils as shown on the plans. The Contractor shall furnish and install additional ECB on all areas exposed during construction that are not shown on the plans unless otherwise directed by the Engineer. The Contractor shall grade all slopes on the lakeshore as shown on the plans. The Contractor shall prepare all exposed soils for seeding and apply specified seed mixes prior to installing ECB or TRM. The surfaces shall be free of large stumps, roots, rock and other debris greater than one-inch in diameter. The surface of the soil shall be raked smooth in preparation for the seedbed (see Special Provision on Seed Mixture). The Contractor shall seed the prepared soil prior to placing the ECB or TRM.

PART 2 - MATERIALS

A. The TRM shall be a permanent turf reinforcement mat of three UV stabilized nets and a coconut fiber matrix having a weight of 0.93 pounds per square yard. Minimum shear stress ratings for the fabric shall be 3.2 pounds per square foot while unvegetated and 8 pounds per square foot when fully vegetated. The TRM shall be installed using 8-gauge metal staples using approximately 12-inches long by 1-inch wide placed or equivalent as approved by the Owner's Representative.

B. The ECB shall be a 70% agricultural straw/30% coconut fiber blanket with biodegradable netting on both sides. The ECB shall have a weight of approximately 0.5 pounds per square yard. All ECB shall be installed using 8-gauge metal staples that are a minimum of 8-inches long by 1-inch wide.

PART 3 - CONSTRUCTION REQUIREMENTS

A. The TRM shall be installed in the locations shown on the plans. Proposed shrubs shall be placed between the TRM and the rock prior to installing the TRM (see Special Provision for shrubs). The TRM shall be installed above the rock toe-of-slope protection and parallel to the lakeshore. The Contractor shall key the bottom of the TRM into the reconstructed slope by placing the TRM upside down, lakeward of the embankment and constructing the slope on top of 0.75-1.0 feet of the TRM (see Special Provision for Embankment Construction). Upon completion of the slope the Contractor shall prepare the slope for seeding (see Special Provision for Seeding) before pulling the TRM over the slope and stapling to the substrate using a pattern of 3.75 staples per square yard or approximately one staple every 12-inches.

The top 0.75-1.0 feet of TRM shall be buried into the reconstructed slope. The ECB (below) shall overlap the TRM by 4-6 inches with the overlap stapled every 12 inches along the seam.

B. The ECB shall be installed in the locations shown on the plans. The ECB shall be installed above the elevation of the TRM and parallel with the shoreline using a minimum staple pattern density of 2 staples per square yard or one staple every 18-inches If one ECB is not wide enough to reach the top of bank, then another ECB shall be laid parallel to the first and overlapping the lower ECB by 4-6 inches. The end of each ECB shall overlap the next downstream ECB by a minimum of 12 inches. All overlaps in ECB shall be stapled on a minimum of 12-inch centers. The fabric shall be keyed in at the top of the slope by stapling and burying the upper 12-18 inches of fabric into a trench. The trench shall be a minimum of 8-inches deep and 8-inches wide. The fabric shall line the trench and then be stapled in place before filling the trench with available substrate.

PART 4 - PAYMENT

No separate payment will be made for furnishing and installing the TRM and ECB. The cost of the site preparation, ECB, TRM, staples, and installation shall be included in the cost of the entire project.

END OF SECTION

SECTION SS08
COCONUT FIBERLOG

PART 1 – DESCRIPTION

This work shall consist of furnishing and installing Coconut Fiber Logs (CFL) and associated Turf Reinforcement Mat (TRM) along the Lake George Shoreline, Treatment A, as shown on the engineering plans. The work includes all incidental backfill and other tasks as necessary to secure the CFL to the shoreline.

PART 2 - MATERIALS

A. The Contractor shall furnish and install a pre-planted 16-inch diameter, 9-lb density Coconut Fiber Log (CFL) in any length deemed manageable. The pre-planted CFL shall be grown for a minimum of 3 months in duration prior to field installation. The majority of the roots shall be visible within 2-inches of the CFL bottom. Loose plant plugs or any number of dead plants will be unacceptable. Replacement plant plugs shall be stapled into the CFL with 8-inch metal sod staples. The CFL shall be planted with the following species in plug form on one-foot centers or less:

Scientific Name	**Common Name**
Acorus calamus	Sweetflag
Carex lupilina	Hop Sedge
Carex stricta	Uptight Sedge
Cephalanthus occidentalis	Buttonbush
Hibiscus species	Rosemallow
Iris versicolor	Blueflag Iris
Lobelia cardinalis	Great Blue Lobelia
Lobelia siphilitica	Cardinal Flower
Pontederia cordata	Pickerel Weed
Rumex verticillatus	Swamp Dock
Scirpus eurycarpum	Giant Burreed
Scirpus fluviatilis	River Bulrush
Scirpus validus	Soft-stem Bulrush

B. The Contractor shall furnish and install hardwood stakes that are 2 x 2-inch nominal dimension lumber and 3-feet long with one end sharpened to a pencil point.

C. The Contractor shall furnish and install 3/8-inch nylon cord that has a minimum strength rating of 300 pounds.

D. Backfill (See Special Provision SS04)

E. Seed (See Special Provision SS05)

F. Turf Reinforcement Mat (See Special Provision SS07)

G. Metal Sod Staples (See Special Provision SS07)

H. Shrubs (See Special Provision SS06)

PART 3 - CONSTRUCTION REQUIREMENTS

A. Work shall be limited to those zones shown on the engineering plans for Treatment A.

B. No heavy equipment will be allowed to transport the CFL or backfill to the shoreline through areas shown on the engineering plans as DO NOT DISTURB. If materials cannot be hand carried into place, then Contractor shall identify an equipment access for each complete section of Treatment A, and then construct a small floating barge to move materials into place.

C. Contractor shall install the CFL as close to the existing shoreline as possible, allowing a minimum of 1/3, and a maximum of 2/3 of the CFL to be under water when staked tightly to the substrate at a water elevation of 602.1. If necessary, the contractor shall hand excavate a trench in the lake bottom to seat the CFL so that the top elevation of the CFL is 602.9 +/- 0.4.

D. The Contractor shall bind the ends of the CFL tightly together as per the manufacturer's specifications, so that no gaps remain between the CFL's.

E. The Contractor shall secure the CFL into the substrate by driving the 2x2 wood stakes through the mesh encasing the CFL and into the substrate on a 65-75 degree angle so that the bottom of the stake is underneath the CFL. Stakes shall be driven on 3-foot centers along each side of the CFL, offset by 1.5 feet, so that the CFL is wedged tightly between the stakes. The stakes shall be driven so that a minimum of three inches of the stake remains above the CFL.

F. The Contractor shall saw a 1/4-inch wide by 3/4-inch deep notch in the outside of each wooden stake.

G. The Contractor shall secure the end of the nylon cord on the first stake in each complete section of CFL and then, pulling tightly, secure it to the stake on the opposite side of the log by wrapping the nylon cord completely around the wood stake at the notch. The Contractor shall pull the nylon cord tightly between each wood stake back and forth across the CFL until the last stake is reached. The nylon cord shall be secured to every fourth stake with a knot.

H. The Contractor shall drive the wood stakes another several inches into the substrate where possible, tightening the nylon cord down over the top of the CFL so that the

CFL is unable to be moved. The Contractor shall then trim the wood stakes such that none of the stakes are above the level of the CFL.

I. The contractor shall unroll the TRM upside down over the top of the CFL allowing 2 feet of the fabric to be shoreward of the CFL. The Contractor shall stake the TRM to the substrate (underwater if necessary) using metal sod staples.

J. The contractor shall backfill between the CFL and the top of the cut slope, burying that portion of the TRM shoreward of the CFL. The backfill shall continue in layers until reaching an even grade from the top of the CFL to the top of the adjacent cut bank.

K. The contractor shall then seed the backfill (see Special Provision for seeding SS05).

L. The contractor shall then install the TRM over the seeded backfill (see Special Provision for TRM SS07). Existing shrubs may be cut off at the elevation of the backfill to facilitate installation or the TRM may be cut to work around the shrubs. All cuts in the TRM shall be securely fastened back to the ground with sod staples on a minimum of 12-inch centers.

M. The Contractor shall install the specified shrubs through the TRM (see Special Provision for Shrubs SS06).

PART 4 – PAYMENT

No separate payment will be made for furnishing and installing the coconut fiber logs. The cost of the site preparation, fiber logs, stakes, lashing cord, incidentals, and installation shall be included in the cost of the entire project.

END OF SECTION

APPENDIX D

MONITORING FORMS AND MAINTENANCE INSTRUCTIONS

SCHOOL CITY AND FLEMING STREET SHORELINE STABILIZATION DESIGN REPORT

LAKE COUNTY, INDIANA

LAKE GEORGE - SHORELINE STABILIZATION
MAINTENANCE AND MONITORING FORM

Date:
Inspector:
Location Description:

1) Do the areas protected with Turf Reinforcement Mats (TRM) and Erosion Control Blankets (ECB) have a well developed, even coverage of vegetation? If not please note areas of concern.

2) Are there any obvious tears or displaced areas of TRM or ECB? If so, please note approximate locations and size of damaged areas.

3) Are there any areas where water has eroded soil out from underneath the TRM or ECB? If so please note where these areas are and their approximate sizes.

4) If you know your plant species, please look at the attached list of plants and note which ones are present within their planting zones including the coir fiber logs.

5) Does the rock toe at the base of the reconstructed slopes and in the access areas appear to be in good condition? If not, what areas are in need of repair?

6) Are the coir fiber logs securely fastened to the substrate and are the ropes and stakes in good condition? If not, please note areas that need attention.

7) Is there a minimum of one plant per lineal foot growing into or through the coir fiber log? If not please note where these areas are in a sketch on the back of this form.

Please send completed forms with Photographs of problem areas to:

Superintendent of Parks and Recreation
Hobart Parks and Recreation Department
111 E. Old Ridge Road
Hobart, IN 46342

SEED

Permanent Grasses, Rushes, and Sedges	
Andropogon scoparius	Little Bluestem
Bouteloua curtipendula	Side Oats Grama
Calamagrostis canadensis	Blue-joint Grass
Carex cristatella	Crested Oval Sedge
Carex normalis	Spreading Oval Sedge
Carex pelitta	Woolly Sedge
Carex tribuloides	Awl-fruited Sedge
Carex vulpinoidea	Brown Fox Sedge
Elymus canadensis	Canada Wild Rye
Elymus virginicus	Virginia Wild Rye
Panicum virgatum	Switch Grass
Sorghastrum nutans	Indian Grass
Spartina pectinata	Prairie Cordgrass
Forbs	
Anemone virginiana	Thimbleweed
Asclepias tuberosa	Butterfly Weed
Aster laevis	Smooth Blue Aster
Aster ericoides	Heath Aster
Aster sagittifolius	Arrow-leaved Aster
Baptesia leucantha	Wild White Indigo
Heliopsis helianthoides	False Sunflower
Lespedeza capitata	Roundheaded Bush Clover
Liastris aspera	Rough Blazing Star
Monarda fistulosa	Wild Bergamot
Penstemon digitalis	Beardtongue
Petalostemum purpureum	Purple Prairie Clover
Ratibida pinnata	Yellow Coneflower
Rudbeckia hirta	Black-eyed Susan
Silphium integrifolium	Rosinweed
Solidago speciosa	Showy Goldenrod

PLUGS

Scientific Name	Common Name
Acorus calamus	Sweetflag
Carex lupulina	Hop Sedge
Carex pelitta	Woolly Sedge
Carex stricta	Tussock Sedge
Cephalanthus occidentalis	Buttonbush
Hibiscus laevis	Rose Mallow
Iris versicolor	Blueflag Iris
Lobelia siphilitica	Great Blue Lobelia
Lobelia cardinalis	Cardinal Flower
Pontederia cordata	Pickerel Weed
Rumex verticillatus	Swamp Dock
Scirpus fluviatilis	River Bulrush
Scirpus validus	Soft-stem Bulrush
Sparganium eurycarpum	Giant Burreed
Shrubs	
Amelanchier arborea	Serviceberry
Cephalanthus occidentalis	Buttonbush
Cornus amomum	Silky Dogwood
Viburnum prunifolium	Blackhaw Viburnum